

# VIRGINIA WILDLIFE

JANUARY/FEBRUARY 2024

FOUR DOLLARS



Consider the Shell Half Full  
for American Oystercatchers



# VIRGINIA WILDLIFE

JANUARY/FEBRUARY 2024

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**RYAN J. BROWN**

Executive Director

**C**onservation" is a word we use a lot here at the Virginia Department of Wildlife Resources (DWR), and most of the staff here have a pretty good idea what that word involves for us as an agency—the habitat management, research, administrative work, and more that we do for wildlife species to help them thrive. But I imagine that if I stopped the average person on the street and asked them what "conservation" means, they wouldn't have the same confidence in their response, simply because it's not something they think about every day like we do.

But you're all our partners in this conservation work. "The Outdoors are Better Together" isn't just a tagline for us; it's reflective of who we are as a Commonwealth. According to the recently released National Survey of Hunting, Fishing, and Wildlife-Associated Recreation, Virginia annually plays host to more than a half million hunters, nearly 1.4 million freshwater and saltwater anglers, and over seven million individuals who engage in wildlife watching in one form or another. Add to that those who take to our waters in one of approximately 247,000 registered boats or countless paddlecraft, and it's clear that Virginians not only deeply care about our natural world, but also that we are a state in which the citizens strongly participate in that world through many forms of outdoor recreation.

Those activities are also conservation in action. As you may know, rather than general tax dollars, DWR largely exists through non-general fund revenues—our efforts are primarily funded by proceeds of license and registration sales, directed state revenues derived from sales of outdoor equipment and watercraft, and federal dollars generated from our constituents. We use these funds to take on conservation of our wildlife and its habitat, connection of the public to the outdoors and recreational opportunities, and protection of our resources and the public. To our hunters, anglers, wildlife watchers, boaters, and other outdoor enthusiasts who enable what we do for our resources and greater public through your investments, we owe a large "thank you"!

You can see how we put those funds to work in an abbreviated version of our Fiscal Year 2023 Annual Report in the final pages of this issue. It's a quick snapshot of the work we do, but I also encourage you to check out the full version of the Annual Report at [virginiawildlife.gov/annual-report-2023](http://virginiawildlife.gov/annual-report-2023). Even though I'm familiar with all that our employees do, I'm always amazed at the breadth and scope of their work.

Our ever-expanding public education and outreach efforts connect the public with the outdoors. We serve as the state's lead boating agency, including registration, titling, and regulation of safe boating on the water. We are also home to a statewide law enforcement division, with our Conservation Police Officers working every day to ensure that the public has a safe experience when they head to our wild places. We operate hatcheries that stock our cold and warm waters with fish that support recreational opportunities. We work to prevent spread of wildlife disease and threats from invasive species. And we are one of Virginia's largest landowners, with nearly 250,000 acres of recreational lands, public fishing lakes, and water access points spread across the state, all provided and managed for the benefit of our wildlife and our public. The list goes on.

We are proud to use this opportunity to provide a report of our agency's activities over the preceding year. In reality, it is but a summary of what goes on in the field and in the agency every day. But we hope that it leaves you with a sense of all that Virginia's wildlife and outdoors have to offer and maybe even spurs an interest to get out and experience our wild places in a new way. Thank you for the opportunity to serve Virginia!



CONSERVE. CONNECT. PROTECT.

#### MISSION STATEMENT

Conserve and manage wildlife populations and habitat for the benefit of present and future generations. Connect people to Virginia's outdoors through boating, education, fishing, hunting, trapping, wildlife viewing and other wildlife-related activities. Protect people and property by promoting safe outdoor experiences and managing human-wildlife conflicts.

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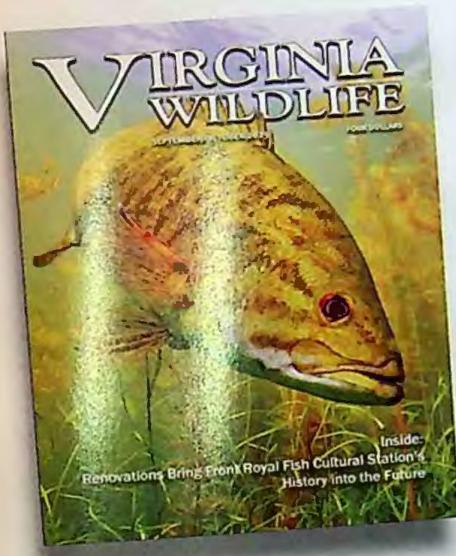
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# From Our Readers



## Thanks for the Reminder

Leaving the leaves for wildlife is something each of us can do! Thank you for the timely [How You Can Help Wildlife] article by Stephen Living that clearly explained the many benefits of leaving fall leaves in our yards wherever possible in the September/October *Virginia Wildlife*. We each need to be reminded of the simple ways to support and protect the wildlife neighbors in our community. Good article and good job supporting the natural world that we all need.

Fay Tyler, Louisa

Fay, thanks for the note! Sometimes the best way to help wildlife is to do less, as in this instance.

-Molly Kirk, editor

## Good Catch!

I noticed in the September/October edition on page 20 that the picture of Dr. Mitchell Byrd on a boat identified the location as the York River Bridge. Actually, the location, I believe, is the Rappahannock River Bridge. The picture

depicts a two-lane bridge with power lines above the roadway. The York River Bridge is four lanes with round pylons for the swing function and no overhead power lines. A minor error which in no way reflects on the accomplishments and contributions Dr. Byrd has made to the Commonwealth.

Tom Inman via email

Tom, thanks for alerting us to the mistake. It does look like we misidentified the bridge—the bridge pictured is the Robert O. Norris Bridge that spans the Rappahannock River between Grey's Point and White Stone.

- Molly Kirk

## Disappointed in Article

In my earlier years, when far from home, I often turned to *Virginia Wildlife* to keep things in perspective, and to help me remember there were better places in this world. Suffice to say, I have been an ardent fan of *Virginia Wildlife* for much of my time on this planet.

In your September/October issue, I read Ms. Stimpson's article about the history of the Green Pastures Recreation Area. As I read, I realized I was trying to spin the words of the article to arrive at something other than yet another opinion of race relations in this country/state. I was unsuccessful in my attempts. Why must you play the proverbial "race card" in, of all places, *Virginia Wildlife*? My beloved magazine has never been about race or any other such social issues. They never belonged in this magazine. Its purity of intent is expressed well in your Mission Statement that appears in the magazine itself; "wildlife-related activities" it says.

Please don't explain that the article was about educating the magazine's readers on the history of our parks system. I enjoy history as much as the next person, maybe more, but phrases used in the article conveyed more than history; to me at least. When you bring up "Jim Crow laws," offer an opinion about "supposedly separate but equal" times, explain how African Americans "had to settle," actions by "white mobs," and "a park so remote that white people wouldn't care," you are outside the "lane" where *Virginia Wildlife* has always resided.

In closing, I offer my hopes that *Virginia Wildlife* will again be the pristine source of "wildlife-related activities" in this amazing state in which we live. I fear that some would endeavor to "remake" this dear magazine into someone's "platform" to be used to effect social change or to drive some other opinionated (not wrong!) personal position. Please believe me when I say you have my best wishes for a successful future of this magazine.

James C. Peery, Lancaster

James, thank you for being a loyal *Virginia Wildlife* reader. It is an essential part of our agency's mission to inspire people to value the outdoors and their role in nature. DWR aspires to welcome all Virginians into outside spaces to recreate safely, knowledgeably, and successfully. Green Pastures Recreation Area was historically open to Black participants in outdoor activities like boating, fishing, and wildlife watching, and now it's available to all visitors for those wildlife-related and boating opportunities.

- Molly Kirk

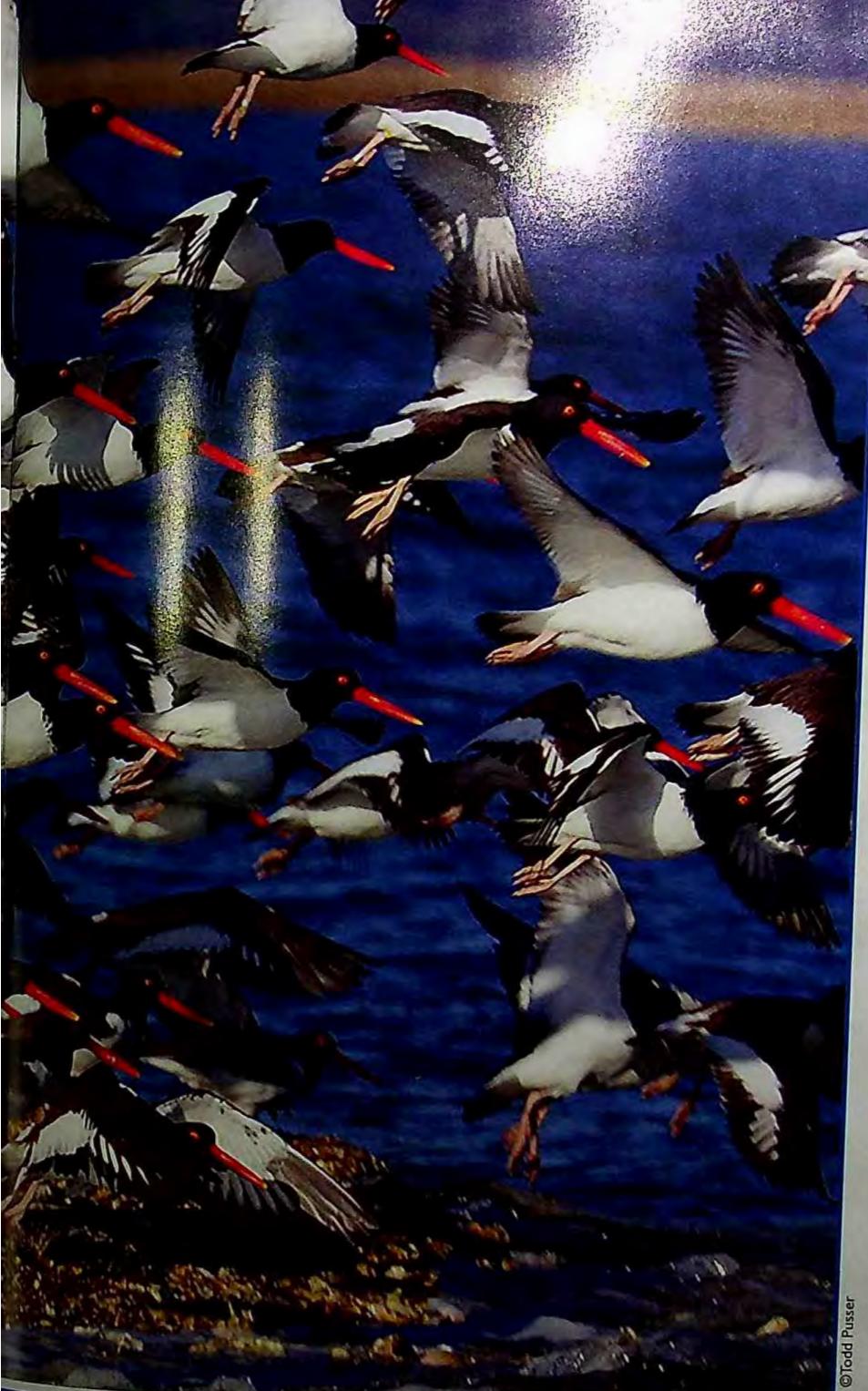
**We want to hear from you!** We welcome letters to the editor, questions for our staff, photos you capture of wildlife, and experiences you want to share. Please include your name and address when you send correspondence to editor@dwr.virginia.gov via email or by mail to Editor, Virginia Wildlife, P.O. Box 90778, Henrico, VA 23228-0778. Correspondence chosen for publication may be edited for clarity and/or length.

Connect with Us!





Consider the Shell Half Full  
for American Oystercatchers



By Curtis J. Badger

I realized not long ago that I have a great deal in common with the American oystercatcher (*Haematopus palliatus*). The oystercatcher enjoys spending time on our seaside beaches and marshes, one of Virginia's wildest and most remote landscapes, a place of great beauty and mystery. I, too, enjoy spending time in marshes and on ocean beaches.

The oystercatcher's favorite food is an oyster on the half-shell, a fact that in my mind elevates it above the more common birds that share its territory. Those other birds eat fiddler crabs, mud snails, ribbon worms, and the larvae of beach beetles buried in the sand. The oystercatcher prefers shellfish that would set it back two dollars a pop if it waddled into a swanky seafood restaurant and ordered a dozen on ice.

What brought this to mind was a recent seaside trip with Captain Meriwether Payne, who takes birdwatchers and anglers on trips to the Virginia barrier islands, which are home turf to her but terra incognita to most of the rest of us. We were watching oystercatchers foraging on a large cluster of shells called an oyster rock. Oysters grow in colonies with their shells attached to each other and to some sort of rigid substrate on the bottom. Unlike clams and most other shellfish, oysters live in one spot until someone comes along and collects them.

©Todd Pusser

Thanks to forward-thinking conservationists, Virginia's barrier islands have the largest nesting population of oystercatchers on the East Coast.

And that's just what those oyster catchers were doing. They weren't chipping them off with an oyster hammer and putting them in a basket like human oystercatchers. They were busily pecking and prodding that narrow lip where the oyster's two shells meet. (They are called bivalves for a reason.) After minutes of frantic work with that formidable red bill, the birds would create an opening between those shells, sever the adductor muscle, and extract the live oyster. I'm pretty darned sure I saw them slurp that salty-sweet liquor remaining in the shell.

A lot of people will say their favorite bird is the bald eagle, or the peregrine falcon, or some other celebrity bird you see on nature programs on TV. My favorite bird is the American oystercatcher. Any bird that slurps oysters on the half-shell is a buddy of mine.

Cruising the sandbars and oyster rocks with Capt. Meriwether in her Carolina Skiff, I was reminded how fortunate we are to have this colorful, crow-size shorebird, a familiar resident today in coastal Virginia. It almost wasn't so.

### Extinction Escaped

In 1913 ornithologist Harold H. Bailey predicted that the American oystercatcher would assume the itinerary of the passenger pigeon and fly off into oblivion. Writing in "The Birds of Virginia" (J.P. Bell Co., Lynchburg), Bailey said, "This is the next bird to become extinct on our Virginia coast, for it is truly a scarce bird now."

Bailey wrote that oystercatchers were once plentiful along the islands and beaches, but by 1913 had been reduced to only a remnant population. "Of late years it has become so scarce that none of our islands can boast of over one or two pair of breeding birds, some not that," wrote Bailey.

The American oystercatcher was not alone. The populations of most shorebirds and wading birds that breed on the coast were at all-time lows. Many birds were down to only a few nesting



pairs, and both population numbers and productivity were alarmingly low.

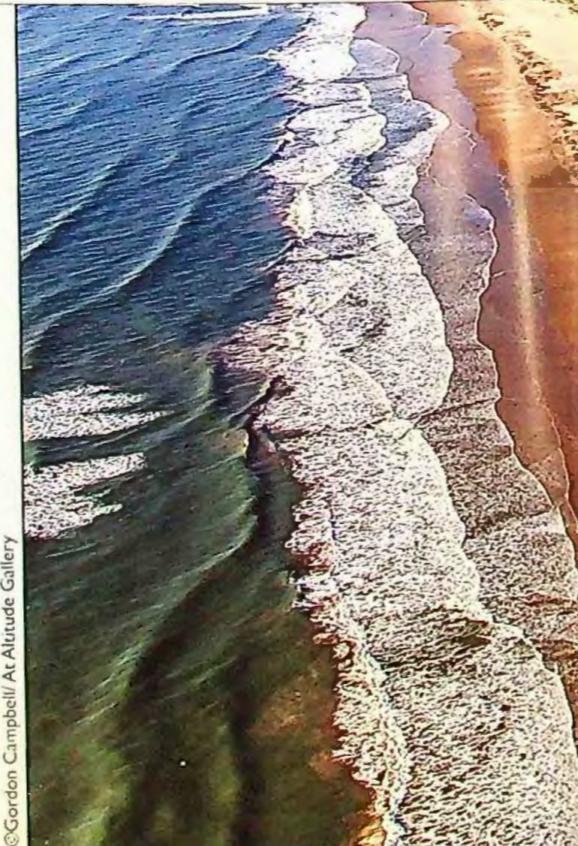
The reason was a tapestry of misfortunes. Spring shorebird hunting had become a popular sport, and when the railroad opened in 1884 linking rural coastal Virginia with northern cities, it mobilized an army of spring shorebird hunters who booked every hunting lodge and hotel they could find. The wealthier of them built private gunning clubs, where they could entertain business clients and political allies in the evening after non-stop shooting during the day.

The result was that in the two decades after the opening of the railroad, the population of most coastal nesting birds had plummeted. Oystercatchers were especially hard hit because they nested on shelly beaches that the hunters used to reach their blinds, and birds that survived the shooting often had their nests trampled by hunters in transit.

Journalists of the day depicted spring shorebird shooting as wholesale slaughter. George Shiras, a congressman and wildlife photographer from Pennsylvania, owned a cottage on Revel Island near the seaside town of



An American oystercatcher holds a freshly shucked oyster.



©Gordon Campbell/Altitude Gallery



American oystercatchers perch on an oyster bed.

©Curtis J. Badger

*Any bird  
that slurps oysters  
on the half-shell  
is a buddy of mine.*



An aerial view of Metompkin Island, revealing prime nesting area for American oystercatchers.

Wachapreague. In his memoir "Hunting Wild Life with Camera and Flashlight," (National Geographic Society, 1936) he wrote, "Day after day, I have seen otherwise reputable sportsmen bring in 200 birds, and when the weather was warm it was practically impossible to keep such birds from spoiling."

As a member of Congress, Shiras began work on legislation that would eventually lead to passage of the Migratory Bird Treaty Act of 1918. The legislation ended the practice of spring shooting, and it outlawed the wasteful killing of birds for the millinery trade, another practice that helped to decimate bird populations. Within a few years, the numbers of oystercatchers and other beach nesting birds were on the rise.

### Conservation Success

Today, the Virginia seaside supports more American oystercatchers than any region on the East Coast. The reason is because in the 1970s, The Nature Conservancy (TNC) began buying barrier islands and contiguous mainland on the Eastern Shore and created the Volgenau Virginia Coast Reserve, a coastal sanctuary of more than 30,000 acres of beach, tidal flats, and saltmarsh. Ironically, the purchase and protection of the islands was made possible by donations from the Mary Flagler Cary Charitable Trust, which was established by the family of Henry Flagler, who developed much of the Florida coast in the late 1800s and founded the Florida East Coast Railway that had made access to the area so easy for the shorebird hunters.

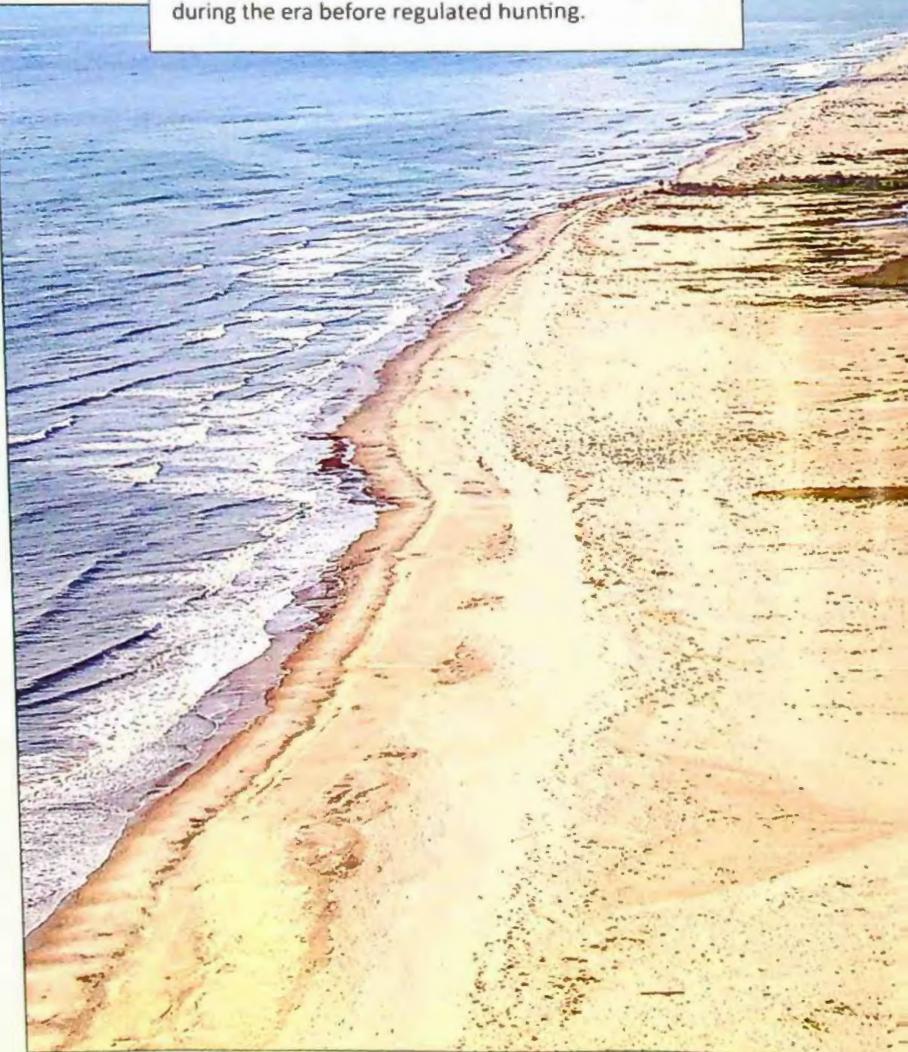
Soon after forming the Volgenau Virginia Coast Reserve, TNC began conducting annual censuses of birds nesting on the beaches and in marshes. Most of the counts were done by volunteers who were put up in a former Coast Guard station owned by TNC.

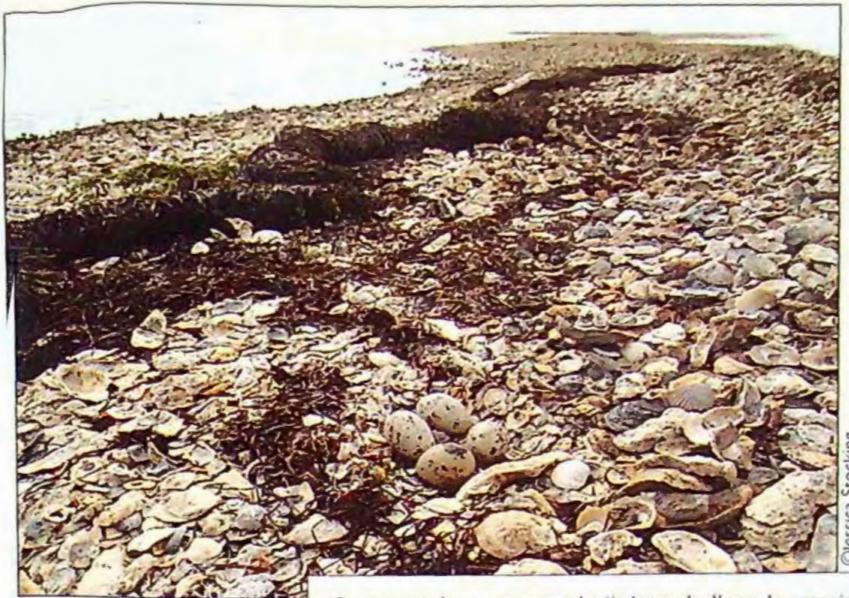
The islands provided excellent nesting areas not only for oystercatchers, but also for the piping plover, whose populations had also been in jeopardy. These

Courtesy of Wikimedia Commons



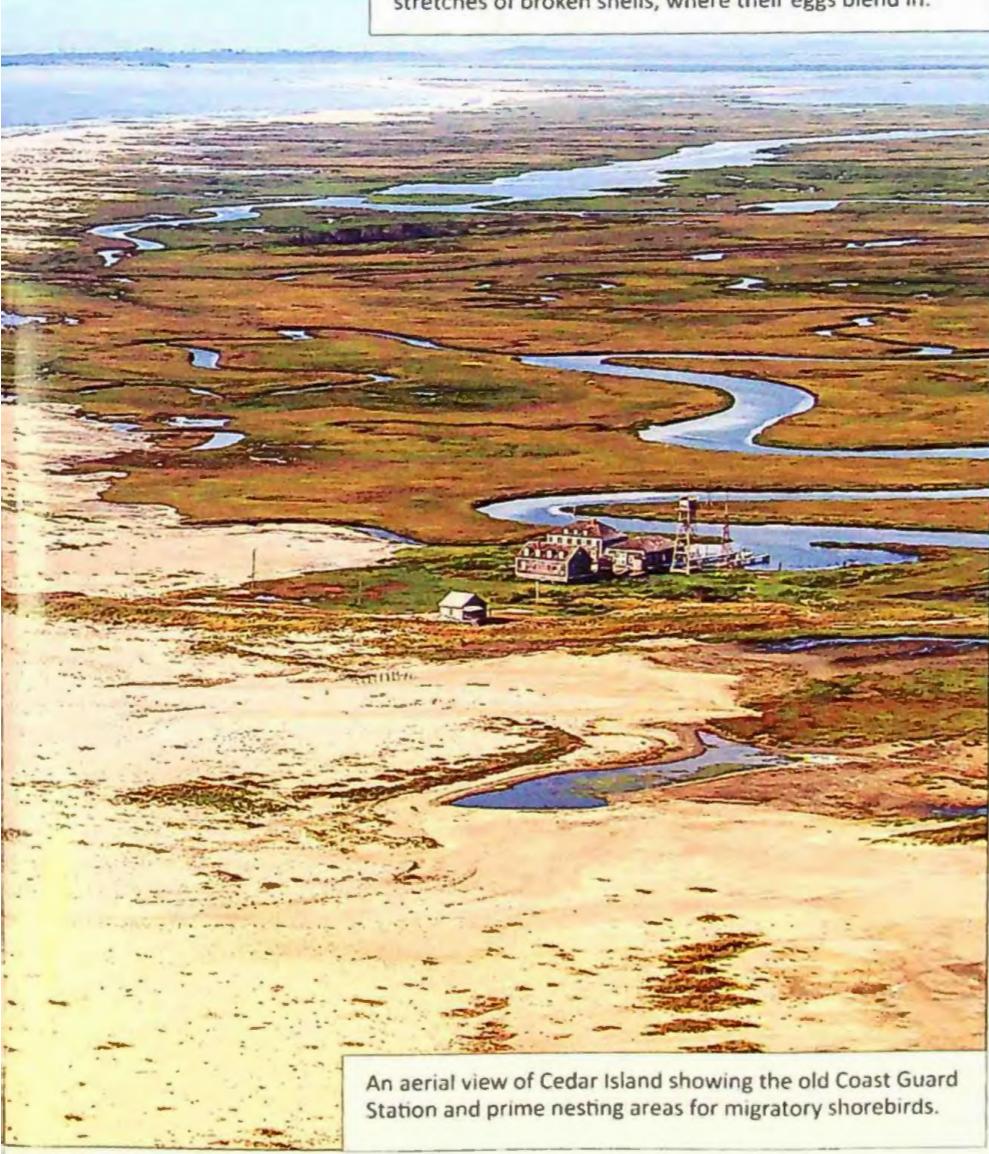
A hunter with an assortment of harvested shorebirds during the era before regulated hunting.





© Jessica Stocking

Oystercatcher nests are built into shallow depressions on stretches of broken shells, where their eggs blend in.



© Gordon Campbell/Altitude Gallery

An aerial view of Cedar Island showing the old Coast Guard Station and prime nesting areas for migratory shorebirds.

are joined by a variety of terns, black skimmers, willets, and numerous others. Some shorebirds, notably the red knot, use the islands to rest and refuel as they make their way to breeding grounds farther north.

In 2022, more than 500 pairs of oystercatchers nested on the barrier island beaches, doubling the total from 20 years previous. Breeding pairs are also found in seaside marshes and in some marshes and islands on the Chesapeake Bay. But the greatest abundance by far is on the seaside barrier islands, and on two islands in particular.

Cedar Island and Metompkin Island are in Accomack County, east of the county seat of Accomac. The islands are separated by Metompkin Inlet, the flush valve for the shallow bays and creeks that usually lay languid and slack behind the islands. But when the tide ebbs, the still water begins to flow with purpose, gathering speed and energy as it becomes confined by the narrow inlet. The tide ebbs and floods every six hours or so, scouring the inlet as it does, ensuring that the inlet remains open.

These islands are low-slung and sandy. Vast areas are overwashed during storms and extreme high tides, creating what geologists call overwash fans. These beaches become covered with shell fragments when the rising tide carries them onto the sand and then retreats, leaving the shell litter behind. Oystercatchers nest in shallow depressions they make among the shell-sand mix, and their similarly colored eggs virtually disappear. The shells even discourage predators like raptors, raccoons, and skunks. Ghost crabs, large and the color of sand, prey upon the birds' eggs, but they prefer sandy areas where it is easier to dig burrows.

Overwash fans are important to birds such as oystercatchers and plovers, but they present dangers of their own. They are at times covered by high tides. If the birds have eggs or chicks on the nest, a high tide could be ruinous. But

the birds nest late in the spring, after the likelihood of March northeasters, and before the tropics heat up in August. So timing is critical.

### Interesting Trends

TNC, the U.S. Fish and Wildlife Service (USFWS), and the Virginia Department of Wildlife Resources (DWR) monitor nesting oystercatchers throughout the seaside, and DWR biologists monitored birds on several Chesapeake Bay islands in 2009, 2011, and 2015.

Ruth Boettcher, a DWR coastal terrestrial biologist, along with other biologists on the Atlantic and Gulf coasts, has studied oystercatchers on the barrier islands for more than a decade, and through banding efforts, she has found that oystercatchers show a high rate of fidelity to breeding areas. "I found a breeding bird on Metompkin Island with a red band with the code J6 on it, and I placed a black J6 band on one of its chicks," she said. "I spotted the bird with red J6 regularly in subsequent years, and then one year the bird with the black J6 band nested on its natal beach."

Captain Meriwether and I had been watching an oystercatcher near Wachapreague with a red J5 band for several seasons. The bird left in the fall and returned to the same spot the following spring. We reported the band number to the American Oystercatcher Working Group, a coalition of researchers who study the migration of oystercatchers, and were told that both red J5 and red J6 had been recorded in the sea islands of Georgia during winter.

Banding and monitoring birds explains a great deal about migration, but it can also create mysteries of its own. Boettcher has for years been working with TNC biologist Alexandra Wilke and a wide range of other partners to study the productivity of nesting birds (the number of young fledged per pair) in various locations on both the seaside and in the Chesapeake Bay. By far, the

Ruth Boettcher, DWR coastal terrestrial biologist, studies the productivity of birds nesting on the barrier islands.



Lynda Richardson/DWR

Ruth Boettcher/DWR



A juvenile American oystercatcher is banded, weighed, and measured before release.

greatest number of birds nest on barrier island beaches, where the population has increased on a yearly basis. But relatively high productivity estimates were found on bayside islands that are eroding and losing elevation at a much faster rate than on the barrier islands.

"Tangier Island has a human population, feral cats, raccoons, and serious loss of habitat because of erosion, but the birds that nest there do produce fledged birds," said Boettcher. "That was a real surprise. And similar breeding success has occurred on other similar islands we've monitored over the past four breeding seasons."



©Jesse Gordon/2023 Audubon Photography Awards

American oystercatchers teach their fledglings how to hunt for food along the coast.

The barrier islands, some of which have been monitored since 2002, have what biologists consider premium nesting conditions—undeveloped and relatively stable nesting habitat—and although the population continues to increase slightly each year, the overall productivity has been on a downward trend.

"This has been a recent trend since 2016," said Wilke. "Prior to that, some of the barrier islands had some of the highest productivity rates of any other site on the Atlantic coast. Seeing that in our long-term monitoring data has resulted in new partnerships with Virginia

Tech to study what might be impacting reproductive success at these sites."

The population on the barrier island beaches is stable and growing slightly, but because oystercatchers have a long lifespan, around 25 years, and do not begin reproducing until they are 3 or 4 years old, it takes a while for a sustained decline in productivity to result in a noticeable decrease in the breeding population.

Management and protection of oystercatchers is being carried out by a large group of dedicated partners, said Wilke. "We meet regularly under the auspices of the Virginia Coast Avian Partnership,

and we coordinate and collaborate on all things needed to protect and manage our beaches for the birds and also provide compatible recreational access for visitors."

The group not only monitors and tracks the population status of oystercatchers, piping plovers, and other species, but they also implement management actions to benefit the birds. "The data we collect during our monitoring efforts, things like how many pairs are nesting, help us identify where things are working and where we might need to adapt our strategies," Wilke said.

Banding and tracking birds has given biologists a better understanding of the movements of oystercatchers. A portion of Virginia's population are year-round residents, while others like red J5 and red J6 typically move south in the fall to wintering areas on the South Carolina or Georgia coast. Birds that nest north of the Commonwealth might be seen in the Virginia islands in winter.

Harold Bailey's dire prediction in his 1913 book did not come to pass, but it easily could have. Like the Carolina parakeet and the passenger pigeon, the oystercatcher could have become a colorful bird that lives on only in history books. Fortunately, thanks in large part to the alarms sounded by Bailey, Shiras, and many others and actions taken by conservation partners, American oystercatchers are alive and well and a vital part of our coastal ecosystem. The next time I slurp a salty seaside oyster, I will take a moment to salute the American oystercatcher, my culinary partner of the tidal flats. 

## *Banding and monitoring birds explains a great deal about migration, but it can also create mysteries of its own.*



Curtis J. Badger is a long time contributor who writes frequently about the history and natural history of Virginia's coast. Recent books include "Wilderness Regained," about the human presence on the barrier islands, and "Peninsulas in Repose," a look at the wooded necks of the Eastern Shore where the English settled in the early 17<sup>th</sup> century.

# Waiting for the Light

**January fly fishing in the Blue Ridge has its own unique beauty and rewards.**

Story and photos  
By Noah Davis

**W**eak January light struggles through the hollow to the stream. With the new year only a day old, my father and I joke that the sun is young and needs to regain its strength for June and July. Here in the heart of winter, we hope the weak rays might convince a trout that a mayfly has hatched and landed above it. It's the light that will warm the air and water one or two degrees and make the brookies rise to eat the flies we cast.

The chance to hold a trout in the cold months is precious. Here in the Blue Ridge above Harrisonburg, Virginia, where the streams stay free of ice year-round, feather-chuckers have the opportunity to catch a trout on the dry even on the shortest of days.

We move through the bare forest of tulip poplars and oaks to the first run, and Dad lands his Royal Wulff in the still water behind a rock. Immediately, the stream beneath the fly bulges from a trout turning just below the surface—a rejection held back by the water's surface tension. After waiting another beat, he lifts the fly and lands it again in that placid stretch. The fly remains unbothered, bobbing in the pool.



"A little cold for him this morning," Dad says, stepping out of the creek and onto the bank. "He knows it'll be warmer in an hour."

I nod, thinking how I would've liked another hour in bed, and we take our time moving through the woods.

A half-hour earlier, in the gravel pull-off where we parked the truck, Dad and I met two other anglers hoping to ring in the new year with the brilliant red bellies of native brookies. As we strung up our 6'6" three-weights, they told us how they'd arrived at first light and dredged the pools and runs with nymphs, only catching bottom in three hours of fishing. They wished us luck as we headed to the stream, and we graciously accepted.

No winter brookie angler needs to set an alarm to go fishing. Because of the shallow nature of most small streams, the water temperature can vary greatly depending on the time of day. Brook trout are most active during the warmest hours—usually from one to four in the afternoon—as this heat also coincides with hatching small blue-winged olives and black winter stoneflies. These bugs are often imitated by general patterns in the average fly angler's box: Griffith's gnats and black elk hair caddis.

The lack of substantial depth in the small creeks of these hollows also makes the trout more willing to rise for food. Picture a medium- to large-sized trout river. During the winter months, trout congregate in large, deep pools because the water temperature doesn't shift dramatically. Even on some of the warmest days, trout will not likely rise four or five feet for a fly. But on a small stream where instead of rising feet the trout is only rising inches, the opportunity for calories is often too much temptation for the brookie.

Dad and I knew nymphs would catch us our fair share of fish, but we didn't drive into the mountains to look at a bobber and wait for it to drop. We wanted to see what was previously unseen: a trout releasing itself from the bottom.

I make my way around a towering white pine and inspect the run below me from the bank. We try to not wade in streams through the winter as the redds—a “nest” of stones where fish lay their eggs—trout build in the fall are fragile and full of the next generation of trout. Look for circles of lighter-colored rock at the tails of pools and shallow riffles and steer clear. Conveniently, most creeks are fished well from shore.

The swift current through the center of the run gives way to soft water on the far side. Balancing on a tentacle-like root, I drop my caddis along the seam. Using my line the way a dog-walker wields a leash, I lead the fly into the plate of sun where a brookie rises. From my elevated position, I see its

**The chance to hold a trout  
in the cold months  
is precious.**



shape darken under the fly, and in anticipation, I draw the caddis off the water too quickly, missing and spooking the fish in the same moment. I float the fly three more times to no avail.

The bare forest reveals the mountains around us. I feel like I can see forever, and remember that in a few months, the ridges will be cloaked in green and line of sight will be cut to under 50 yards. Then, I'll be thankful for the shade, but now, I'm glad there's nothing but the hills to block the sun.

Dad calls for a picture, and I find him kneeling upstream, cradling a six-inch brookie. The sides are so smooth and spots so clear it appears as if the body is sheathed in ice.

"It ate by the log over there," he grins.

After a few photos, Dad slips the trout back into the creek, and I head to the plunge pool above. Falling water digs a bathtub-sized hole in the streambed, and beyond the white bubbles the surface calms. As I strip line off my reel, I tell myself to let the fish swallow my offering. Don't be quick. Winter fish aren't as fast as those in May. The trout, along with everyone and everything else, slow down here in January.

The fly lands in the wash and drifts into the shallows. The trout rises slowly like the last, but instead of flinching, I breathe and lift my rod until I feel the wild pull of the trout twisting against the hook's pinch.

Quickly lifting the fish from the creek, I watch his spawning colors spin in the air then come to rest in my hand. Dad and I admire him and our eyes follow his path as he kicks back into the pool, hanging on the edge to regain his breath.

"It's just now past one," Dad says, looking up at the sun above us.

"It seems like they're really waking up," I say while drying my stinging cold hand on my pants.

We continue upstream toward more trout, more water, and a light that seems to grow stronger with every step. ↗

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*Noah Davis grew up casting to native brook trout and chasing big woods whitetails. He now works for the Theodore Roosevelt Conservation Partnership helping to guarantee all Americans quality places to hunt and fish.*







# Footing the Bill: Virginia's National Forest Stamp at Work

The few dollars that hunters, anglers, and trappers spend each year on a National Forest Stamp go a long way when putting habitat work on the ground.



## By Justin Folks/DWR

The George Washington and Jefferson National Forests span nearly 1.7 million acres in our Commonwealth, providing Virginians ample space to explore the wild. In order to hunt, fish, or trap on National Forest lands in Virginia, one must purchase a National Forest Stamp. Many hunters, anglers, and trappers purchase this four-dollar stamp knowing little more than that if they don't, they get a ticket. Many of you may wonder, "what is this National Forest Stamp, and where does the money go?"

In a 1963 letter from T. C. Fearnow, an Assistant Regional Forester with the U.S. Forest Service (USFS), to James McInister, Jr., the editor of *Virginia Wildlife* magazine at the time, Fearnow included a transcript of a talk he had given at the 1950 Southeastern Wildlife Conference in Richmond, Virginia, about what was known as the "Virginia Plan." In the transcript, Fearnow stated:

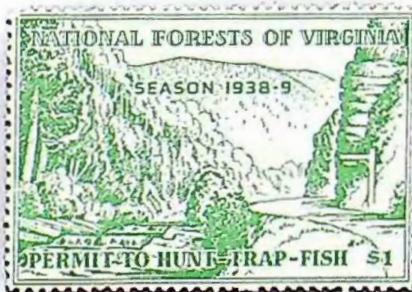
"The Virginia Plan is a remarkable example of cooperative endeavor, under which State and Federal agencies have effectively pooled resources and manpower on behalf of a common cause.

"It was not the creation of any one man's mind. It is a composite program resulting from ideas of many interested persons. It apparently had its origin in the early efforts of Justus H. Cline of Stuarts Draft, Virginia, to create the Big Levels Game Refuge back in the early 1930s.

"John W. McNair, who was Supervisor of the George Washington Forest at that time, and A. R. Cochran, who was District Ranger on the area from which the refuge was carved, had the vision to get behind this project and give it their full support. Success on this relatively small area demonstrated the possibilities for broader application of the three-way alliance between the

Game Commission, the U.S. Forest Service, and sportsmen. Former Game Commission Director Carl Nolting and Executive Secretary M. D. Hart threw the weight of the Commission behind this broad program, and T. E. Clark, who was first associated with the Forest Service and later with the Virginia Commission of Game and Inland Fisheries, filled in many details and refinements that only a technician could supply. Thus the 'Virginia Plan' came into being and one wonders why this approach to wildlife management on public lands did not develop earlier."

The successful collaboration among USFS, the Game Commission (now the Virginia Department of Wildlife Resources [DWR]), and sportsmen at Big Levels spurred this Virginia Plan, from which the National Forest Stamp was born. The National Forest Stamp was unveiled for the 1938-1939 hunting season at the cost of one dollar. Funds generated from this stamp were (and continue to be) used to implement wildlife habitat projects on National Forest lands within Virginia. To this day,



Left: One of the projects that National Forest Stamps help fund is the application of limestone sand into trout streams in the Saint Mary's Wilderness to improve water quality and healthy aquatic habitats for native brook trout and other animals.

### Why Just Hunters, Trappers, and Anglers?

Many outdoor enthusiasts who purchase the \$4 National Forest Stamp to be able to hunt, trap, and fish on National Forest lands wonder why other outdoor enthusiasts, such as hikers or wildlife watchers, don't also need to complete this purchase to access the land.

Dawn Kirk, forest fisheries biologist at the U.S. Forest Service, explained: "The National Forest Stamp goes back to 1938 (\$1) when the Virginia State game agency and Forest Service first developed a plan to improve wildlife and fish habitat on National Forest to benefit hunters and anglers. Except at developed recreation sites, there is no charge to recreate (hike, bird-watch, berry-pick, bike, disperse-camp, etc.) on the National Forest. The state has jurisdiction over game species management and sets hunting and fishing regulations and permits; the Forest Stamp was seen as a way to support the habitats that allow for that recreation. There has been discussion in the past suggesting the state develop a voluntary 'stamp' for hiking and wildlife viewing, where the proceeds would support those activities on National Forest, but it has not moved past initial discussions and been incorporated into the code of Virginia."

Virginia is the only state with such a stamp.

### Habitat Work is Better Together

In early years, while some habitat improvements were made, much of the funding was used for wildlife restoration efforts such as stocking deer and turkeys. Funds were also used to employ resident wildlife managers to work on National Forest lands. Fearnow's transcript states, "Each of the wildlife managers on national forest land is provided with a small allotment of funds with which to employ local labor and, at times, the total wildlife work force may run as high as 100 men on the two Virginia Forests."

Although this workforce model no longer exists, habitat is still being restored and maintained. Each year, staff from DWR and USFS meet to prioritize which planned habitat projects will receive funding from Forest Stamp dollars. As stated in code, funding from stamp dollars must be used for projects related to hunting or fishing (since hunters and anglers are the ones who must purchase these stamps), but each staff member knows full well that the benefits of each project reach well beyond game species. Example projects include removing dams to improve fish passage and fish habitat, implementing prescribed burns,



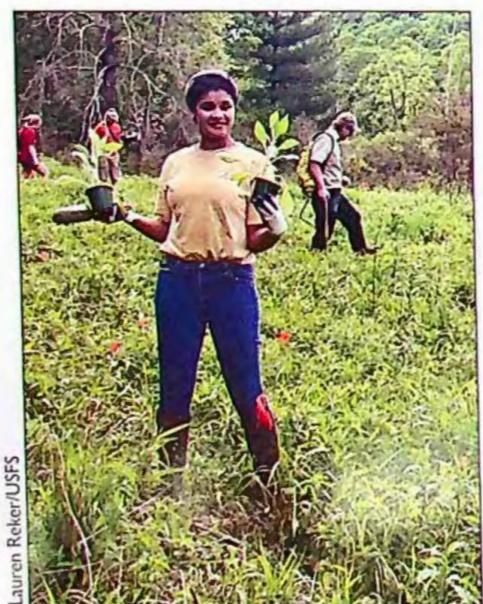
A streambed and streambank restoration project on Dry Run on the Mount Rogers National Recreation Area (before on left, after on right) improves aquatic habitat and reduces sediment load to benefit trout and numerous other aquatic species.

©David Hart



Lauren Reker/USFS

Native meadow restoration work on the Clinch Ranger District within the George Washington and Jefferson National Forests has benefited many important pollinator species, songbirds, and other nongame species while offering forage and cover for deer, turkey, and ruffed grouse. Much of this work would not be possible without the efforts of volunteers.



Lauren Reker/USFS



Lauren Reker/USFS



restoring native meadows and grasslands, managing non-native invasive plants, liming of native trout streams to mitigate the effects of acid rain, maintaining forest openings, improving public access, and more.

"I hunt in western Virginia on George Washington National Forest in search of quality whitetail bucks and have had good success around timber stand improvements, clear cuts, and prescribed burn units. Anywhere there is a change in habitat from old-growth forest is usually a good place to start finding deer on National Forest," said Josh Simmers, a hunter who frequents National Forest lands.

Through the years, additional partners have collaborated with DWR and USFS with both financial and technical contributions. Organizations such as Trout Unlimited (TU), the National Wild Turkey Federation (NWTF), and others have helped see habitat projects through. NWTF has been particularly instrumental in getting habitat on the ground by assisting with the administration of project contracts and the purchasing of supplies and equipment. Without NWTF's involvement, habitat work would be held up in a sea of governmental red tape and purchasing

restrictions. Beyond contract administration and purchasing, NWTF has also contributed financially through its "Superfund."

The NWTF Superfund consists of moneys raised from NWTF banquets across the country—funds that are then used for habitat work to benefit wild turkeys and other wildlife in the states in which the funds were raised. After suffering some setbacks due to the COVID pandemic, NWTF has rebounded significantly. Just this past year, NWTF was able to fully fund all proposed Stamp projects when many typically go unfunded (there are always more projects than there are funds available). It's only fitting that such an organization—and one founded in Virginia no less—is such a key partner with the one-of-a-kind National Forest Stamp program that began so long ago as the Virginia Plan.

Another great partner in western Virginia is the Appalachian Habitat Association (AHA), whose mission is to promote habitat management work on public lands primarily in Alleghany, Augusta, Bath, Botetourt, Craig, and Rockbridge counties. The AHA has helped with many projects on both state and federal lands. Countless volunteers have also contributed their time and sweat to

complete projects over the years, helping these dollars stretch even further.

### Quite the Conundrum

Unfortunately, Virginia has seen a decline in the purchase of National Forest Stamps over the years, and with it, a decline in the amount of funds available for critical habitat and infrastructure work. This has coincided with a declining number of hunting license sales. Ironically, it might be a little of a chicken/egg situation, as the declines in both hunting license sales and National Forest Stamp sales could be attributed to declining habitat quality on National Forest lands for game species. A decline in habitat work yields less game to encourage those to buy the stamp that helps create and maintain habitat.

It's quite a conundrum, but this is only one piece of the puzzle, as hunting license sales have been declining significantly for decades nationwide. To compound the problem, the cost of labor, supplies, and equipment only continues to increase annually, while the cost of the Forest Stamp itself has remained minimal for 75 years (it was \$1 at its inception in 1938 and is currently \$4).

What can you do to help? Purchase a National Forest Stamp and explore the wild of our National Forests. Get involved with your local chapters of NWTF, TU, or other conservation organizations that support our efforts. Reach out to your local DWR or USFS biologists with project ideas and help raise funds to get them done, or volunteer to help on work days.

Although the National Forest Stamp program is largely driven by hunters and anglers, these projects are critical for many nongame species. If not for the early efforts of those forward-thinking conservationists in the 1930s and their Virginia Plan, many of the wildlife species we enjoy today may not exist. If we don't continue that effort, future generations of our National Forest users may not be as fortunate.

*Justin Folks is the DWR deer project leader.*



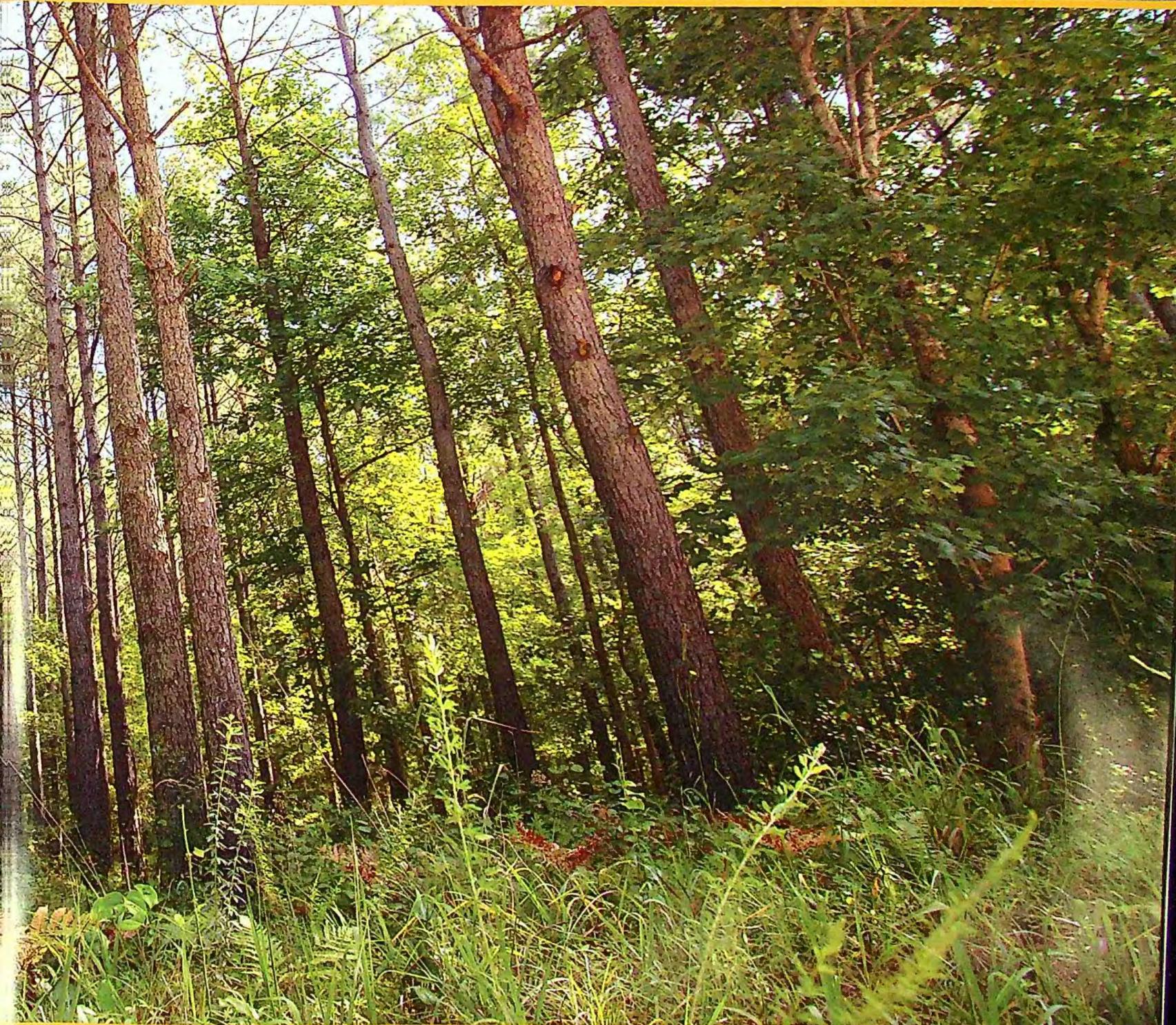
# Explore the Wild at the



The Virginia Department of Wildlife Resources maintains 78 Wildlife Management Areas (WMA) and Wildlife Conservation Sites (WCS), with nearly 250,000 acres of land managed for a diversity of wildlife habitats and open to the public for wildlife-related recreational opportunities. For more information: [virginiawildlife.gov/wma](http://virginiawildlife.gov/wma).

# Flippo-Gentry Wildlife Management Area

✓ Hunting ✓ Trapping ✓ Primitive Camping ✓ Hiking ✓ Birding



Flippo-Gentry WMA is named for Game Wardens Allen Flippo and Donald Gentry, killed in a 1972 plane crash in the area while flying a night patrol. The 2,000 acres of predominantly upland loblolly pine forests and mature forest swamps in Sussex County offer excellent deer, turkey, and small game hunting. The habitat supports a wide range of other wildlife species, including bobwhite quail, brown-headed nuthatch, red-headed and pileated woodpeckers, summer tanager, and a variety of warblers. The Parker's Branch Tract provides additional opportunity to restore longleaf pine and develop habitat to benefit the federally endangered red-cockaded woodpecker, currently found on nearby property.



# A Library



# Like No Other

The species on display at the  
**Nunnally Ichthyology Collection**  
are a remarkable record of fishes over time  
and across Virginia.

By Glenda C. Booth  
Photos by Lynda Richardson/DWR

**I**magine a library of... fishes. Instead of rows of books, this library has shelves lined with jars containing fish after fish, all intact and eerily floating forever in a solution of ethyl alcohol instead of water. Working on a research project? You can even check out a preserved specimen from a specific date and place.

This place, the Nunnally Ichthyology Collection at the Virginia Institute of Marine Science (VIMS) in Gloucester Point, Virginia, is a unique repository of almost 500,000 fish, all available to researchers for study.

"The fish collection, per se, is not doing research. But what we are doing is we are supporting the research that's being done at VIMS and elsewhere," said Dr. Sarah K. Huber, the curatorial associate and collection manager. Keeping the fish samples a researcher uses can prove important not only for other scientists to verify those findings, but also to use for other research projects.

"We have a lot of things that come to us for one research program, and then they end up being loaned out for something totally different than the original researcher imagined," said Huber. One sailfish in the collection was originally used in a study of the genetics of billfishes decades ago, but recently Harvard University contacted the collection for an unusual request that the sailfish was able to fulfill.

"Harvard was doing a project trying to develop a robotic suction cup that was similar to a remora's suction cup, and they needed to test those robots on substrate that those animals encounter in the wild," said Huber. "So we took this sailfish that had been collected 20 years earlier for one project and we cut skin samples off of it. We did that for a variety of other species that had come from different research projects, and then we loaned the Harvard researchers the skin samples so that they could do their research. And when they were done, they sent them back, and now I've got those little squares of fish skin in jars."

Huber laughs when the conversation turns to how interesting, and yet odd, her job as the keeper of jars of fish is. "I always tell people that I'm a dead fish librarian. That's how I explain it to my parents, too!" she said.

### A Unique Glimpse

For more than 60 years, ichthyologists have created and



A jar of larval Antarctic silverfish is among hundreds of fish in the collection.

maintained what has become the largest repository of fish species in Virginia. The collection has around half a million individual fish in 46,000 lots. A lot is essentially a jar of specimens of one species that was collected at one place at one time.

While the collection has fishes from all over the world, its holdings are particularly strong in marine, estuarine, and freshwater fishes from the Chesapeake Bay and its tributaries, Virginia's coastal waters, the deep waters of the western North Atlantic, the upper reaches of Chesapeake and Delaware bays, and Virginia's rivers, streams, and lakes, with a focus on the unique fauna of the central Appalachians.

The fishes and larvae come from VIMS scientists and employees of the Virginia Departments of Wildlife Resources (DWR) and Conservation and Recreation (DCR) and the National Oceanic and Atmospheric Administration (NOAA). The collection also does its own annual trip to western Virginia to collect samples. Roanoke College, Virginia Tech, and some other colleges have collections, but they are much smaller. The Nunnally Collection has absorbed collections from the



The stacks at the Nunnally Ichthyology Collection are full of jars of fishes. Dr. Eric Hilton (left) holds a specimen of a bowfin, while Dr. Sarah Huber holds a snakehead specimen. On the floor is a striped bass specimen.



Some specimens in the collection are preserved by carpet beetles that consume the flesh and leave the skeleton.



Dr. Eric Hilton examines a black-banded sunfish specimen that was collected by DWR biologists in Sussex County.

University of Richmond, Virginia Commonwealth University, and the Chesapeake Biological Laboratory.

"We have some remarkable time series in our collection," said Huber. "You can go back in time 50, 60, 70, 80 years and see what was collected in one particular place. There are species that start showing up in the record that weren't there before, and there are species that disappear. There are times when you get weird hybrids that are coming out of these areas. When we have these long-time series, it's really magic, because you can look at how these animals are actually changing—in distribution and anatomy—over time, related to environmental factors or invasive species introduction."

### Organizing and Preserving Fish

The collection's fishes are kept in screw-top glass jars ranging in size from four ounces to gallons and even larger. Once the specimen has been preserved in formalin, it's transferred to a jar filled with 70 percent ethyl alcohol that preserves the specimens forever.

Dr. Eric Hilton, curator of fishes at the Nunnally Collection, is studying the Atlantic wolf fish in part using specimens collected in the 1700s. "Carolus Linnaeus first described this fish, and I am including observations on his original

specimens," he noted. Linnaeus, 1707-1778, was a Swedish botanist and taxonomist who created a system of naming organisms and is known as the "father of modern taxonomy." Linnaeus' wolf fish specimen was preserved dry, pressed flat on herbarium paper.

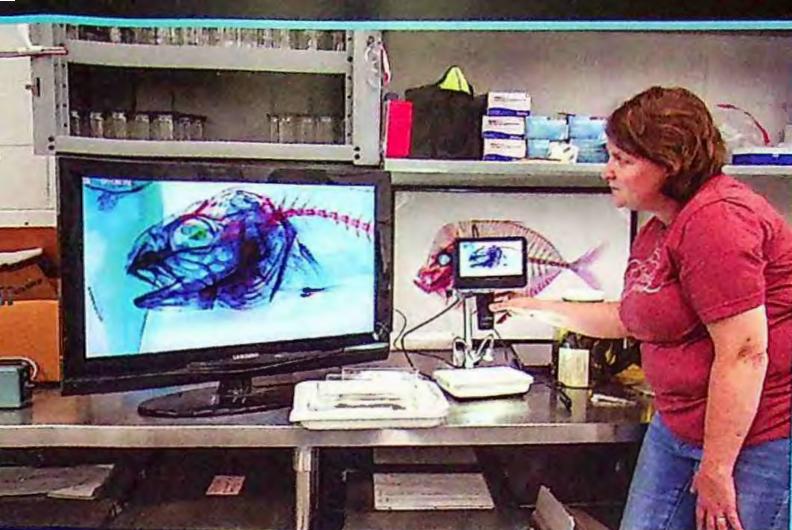
Another preservation method is using carpet beetles that nibble all the meat off the fishes' bones and leave the skeleton, "nature's way," Hilton commented. The lab has approximately 600 skeletons.

Along with beetles, Hilton and Huber also utilize modern technology to expand the collection, scanning specimens with computed tomography (CT). "You can build these gorgeous three-dimensional computer structures," Huber explained. "You can also do digital dissections with a CT scan—looking at muscles, bones, stomach contents, blood vessels, and internal parasites—while leaving the specimen intact. We've started CT scanning a lot of our rare specimens and some of our older specimens. It gives them new life and new information to provide to researchers, which is really cool."

Each lot is cataloged with a unique number, the species name, what entity collected it, and the latitude and longitude of the collection. The collection maintains



Fish skeletons, such as that of a remora that Dr. Sarah Huber is holding, are stored in plastic bags in drawers and available to researchers.



Specimens in the Nunnally Collection are available for researchers to study either at VIMS or on loan.



Correctly identifying the species of a fish specimen, as Dr. Eric Hilton is doing here, is an important step in adding it to the collection.

an open database, searchable by anyone. “We catalog roughly 4,000 lots of fish a year, which is approximately 20,000 to 30,000 individuals,” said Huber. “We don’t bring in everything—we have a specimen management plan with respect to accessioning. We prioritize specimens that will contribute to research being done.”

## What We Can Learn

The collection, funded by the state and the Nunnally Ichthyology Endowment, advances the knowledge of scientists, the public, and policy makers. For example, scientists can better understand a species’ adaptation in range by studying the specimen collection locations. By doing tissue analyses, they may find ingested microplastics. An analysis of stomach contents can tell them what fish are feeding on.

The fish collection also helps scientists track invasive fishes like blue catfish, northern snakeheads, and Alabama bass. The

collection has specimens of these fishes, including some of the first snakeheads found in certain drainages across Virginia. Studying these specimens can help determine their spread.

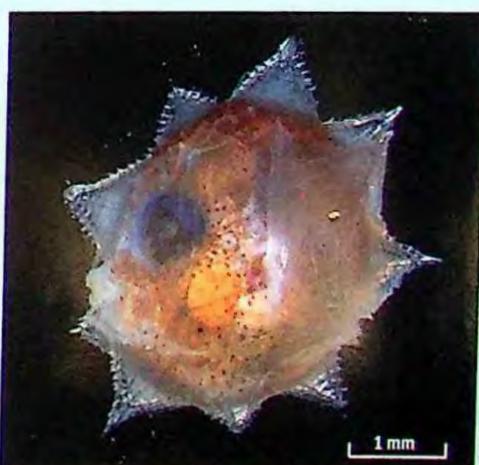
“Collections like the Nunnally help to document and track where fishes occur, when they were introduced, and help identify rare or unusual species,” said DWR Chief of Aquatics Dr. Mike Bednarski. “As an example, the Nunnally collection hosts one of the first Alabama bass collected in Virginia. This individual will help scientists and managers working many, many decades in the future to understand the history of this invasive species.”

Blue catfish were stocked into rivers in Virginia in the early 1970s. The collection has juveniles from the James River collected in 1977 that are perhaps among the first offspring from those stocked individuals. “This can give us a new perspective on the early steps in this invasion, which has now exploded,” explains Hilton. “As new introductions are encountered and

## Small Specimens, Big Stories

Some of the smallest specimens at the Nunnally Ichthyology Collection are also some of its most fascinating—the larval fish collection. The collection has one of the most extensive larval fish collections in the world, with about 50,000 larval fish vials. To the novice, some larvae look like tiny translucent fish with a black eye; some look like shrimp; some are tiny, nondescript balls.

Dr. Sarah Huber recalled that a VIMS graduate student was dissecting a fish for a project and made a unique addition to the collection. “In that fish’s stomach, she found a larval ocean sunfish in a stage that is almost unheard of in collections,” Huber said. “So now we have a little, baby ocean sunfish larva that’s pencil eraser size. It’s part of a missing stage of ocean sunfish larvae that doesn’t get captured very often, so no one’s really sure where they are or what they’re doing at this particular stage in their development. She was able to find a gorgeous specimen in the stomach of another specimen that ended up going into our collection. We find some really cool things. Not just in what we collect, but in the bellies of things we collect, too!”



This larval ocean sunfish is a unique specimen found in the stomach of another specimen.

Collection of Nalani Schell/Dave Johnson/Smithsonian

specimens are deposited in the collection, we take tissue samples, which, down the road, can give us the ability to learn more through genetics of the source of the introduction, for instance, whether it was through an aquarium introduction or another established population."

With climate change affecting fish species, understanding changes over time is especially important. "We're in a changing world. Virginia's environment is changing, and the fish fauna will change with that," said Hilton. "With specimens in the collection, we can have a better appreciation of what happens over time. We can never truly go back in time, but in many ways we can through these specimens."

The southern flounder, a fish that spawns offshore and before its larvae move to fresh rivers, traditionally did not spawn north of Cape Hatteras, North Carolina. But scientists have now found juvenile fish in the tributaries of the Chesapeake Bay, an indication that the fish's spawning is shifting north. Scientists have also confirmed that the peak of American shad spawning in Virginia's tributaries is three weeks sooner than it was 25 years ago.

### Educating About Biodiversity

For most people, fishes are usually hard to see in the wild. The Nunnally collection offers opportunities to see them up close, to study their size, shape, skin, fins, gills, and teeth, for example. For most people, visiting the collection is likely the only place and time to get close to a great white shark, a macro-predator and deep-sea fish rarely seen in the wild. From perch

to puffers, from catfish to croakers, the collection documents the great diversity of fish species in Virginia's waters.

Bednarski applauds the collection's educational value. "Collections represent a powerful educational tool for sharing information about Virginia's diverse fish community with the general public and with students, fostering a greater appreciation and understanding of our aquatic wildlife and providing a great benefit to our educators and our constituents," he said.

"I get excited about a lot of the outreach and education opportunities that we have in the collection. We bring in tour groups, camps, scouting groups, retirement homes, as much of the general public as we can," said Huber. "I love that because it gives me an opportunity to talk about biodiversity in Virginia because we are the fish collection for the state of Virginia and so we have a huge diversity of freshwater marine and estuarine Virginia species in our collection."

"It's really exciting to be able to not only talk about this to people, but also to show them. There's nothing like actually looking at the fish, at the specimen, to give you a better appreciation. Being able to have the general public interact with physical specimens is a really helpful way for them to learn about biodiversity and the importance of the species that we have in our area." 

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*Glenda C. Booth, a freelance writer, grew up in Southwest Virginia and lived in Northern Virginia over 30 years, where she is active in conservation efforts.*



A cleaned and stained species of flatfish (left) and a lookdown are preserved in glycerin to keep their bodies clear. Blue stain indicates cartilage, while red stain indicates bone.



A specimen of a juvenile great white shark is one of the most eye-catching for visitors.

#### Learn more about the Nunnally Ichthyology

**Collection at:** [www.vims.edu/research/facilities/  
fishcollection/](http://www.vims.edu/research/facilities/fishcollection/)

The public can visit the collection on VIMS' Marine Science Day held annually every June, next on June 1, 2024. The collection is named for the late Moses D. Nunnally, who established a trust to support charitable giving in the greater Richmond area and to VIMS, including the collection.



VIMS/Liu/Zhuo

# Install a Wood Duck Box!



Adding this artificial nesting habitat to your property can be a great way to help local wood ducks, but placement and maintenance are the keys to success.

By Mallory Shaw/DWR and Laura Wallace/DWR  
Photos by Meghan Marchetti/DWR

**K**nown for their colorful plumage and elegant demeanor, wood ducks continuously capture our hearts. Once hunted to the brink of extinction, this species has made a remarkable comeback. Wood ducks (*Aix sponsa*) are a much-admired species among Virginia's waterfowl hunters, bird watchers, and nature enthusiasts; they are also a sign of environmental quality and a flagship species whose protections extend to other wildlife using the same habitat.

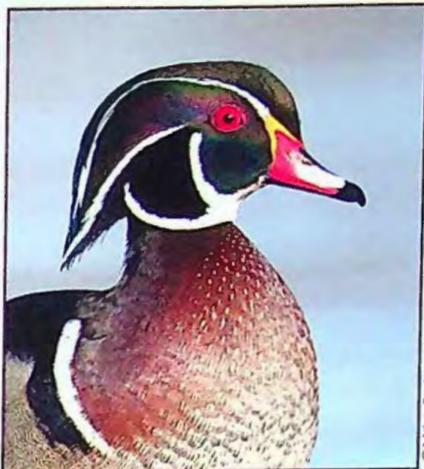
Throughout the country, waterfowl biologists monitor eastern wood duck populations to determine appropriate bag limits each year, ensuring the population stays relatively consistent or increasing. In Virginia, wetlands are managed to reduce invasive plants and increase the prevalence of native plants and invertebrates that wildlife depend on for food and shelter. Some management practices to improve environmental quality include prescribed burns, water level manipulation, and herbicide application.

Hunting regulations and habitat conservation efforts were integral to the wood duck resurgence, but wood duck boxes are an especially effective method used to supplement quality nesting habitat. By erecting a nesting box on your property, you too can play an active role in wood duck conservation.

### Location, Location, Location

Wood ducks are one of the few waterfowl species that nest above ground, traditionally in tree cavities. They prefer woodland habitat near wetlands, and adding an artificial nesting box to their options in locations that fit the bill (where water sources meet woodlands, like wetlands or riverbanks or ponds with trees on the banks) can help maintain wood duck populations.

When choosing a site for your box, look for a location that's close to shallow water with lots of vegetative cover for ducklings to hide and forage. Ideally, a box should be erected on a six- to 12-foot treated piece of lumber and fitted with a predator guard. It is also important to place boxes a safe distance



©Mike Roberts

away from trees and other structures that predators could use to reach the boxes from above—if placed in a forested area, be sure to trim away branches that get too close to the box.

Once it is time to leave the nest, ducklings may jump from great heights—up to 30 feet—before following their mother to safety; therefore, it is best for ducklings to be close to water to reduce the difficulty and danger of this journey. Boxes should be placed within 600 feet of water, ideally over shallow water in

flooded forests. Facing the opening toward water with an unobstructed line of flight will attract greater attention from hens and increase the odds of a box being used.

If erecting multiple boxes, be sure to space them at least 50 feet apart. Wood ducks can dump nest, meaning hens may lay eggs in nests of other hens. Too many eggs in a nest can cause a hen to abandon it. This behavior occurs when multiple nests are in close proximity, so providing plenty of space between boxes will prevent this problem.

Looking for building plans for a wood duck box?



Shutterstock/Aaron J. Hill

There are a number of useful resources online, such as:  
[ducks.org/conservation/waterfowl-research-science/  
build-a-wood-duck-box](https://ducks.org/conservation/waterfowl-research-science/build-a-wood-duck-box)

A properly placed wood duck nest box, like this one in the Chickahominy Wildlife Management Area that Laura Wallace (left) and Mallory Shaw (right) are checking, can provide valuable habitat for this charismatic species.

## Maintenance is Key

After a box is installed, it is crucial to clean and maintain it annually to encourage the ducks to return. Boxes should be checked in the fall or winter months when they are not in use. In Virginia, nesting can begin as early as March and continue into July.

Compared to northern populations of wood ducks, southern populations tend to move and migrate shorter distances. While most eastern U.S. wood duck populations are resident, migratory populations can travel as far as from New Brunswick to Florida. With the energy that is saved by shorter migration, females in southern populations can begin nesting earlier. Those that do nest earlier are more likely to renest a second time. Wood ducks can have double broods, meaning after their first clutch of eggs are hatched and raised (or if their first nesting attempt fails), they will attempt to lay and raise another brood.

It is very important to provide nesting material in the boxes as wood ducks rely on the rotting wood and debris found in natural cavities to protect their eggs. A hefty layer of wood shavings from a local hardware store will work well to provide insulation and cover. Proper maintenance includes replacing wood shavings, removing wasp nests, and resecuring or replacing panels and nails as needed.

Waterfowl biologists will attest to the importance of maintaining wood duck boxes. Chickahominy Wildlife Management Area (WMA) in Charles City County, Virginia, is one location where Virginia Department of Wildlife Resources (DWR) biologists have been actively managing nest boxes. Over a span of just three years, they saw nearly a 70 percent increase in the use of the boxes after conducting proper maintenance techniques!

In fact, failure to clean out boxes can be counterproductive. Birds may attempt to start a nest, but a buildup of debris from previous years creates unfavorable conditions, leading to failure to hatch or hen abandonment. The wood duck box initiative began across the country in the 1930s and was adopted by DWR approximately 25 years ago. Since then, DWR has monitored the success of their nesting boxes, and the data have shown proper maintenance of these boxes to increase box use and in turn the productivity of our nesting wood ducks. DWR continues to add nest boxes across the state, with some of the most recent ones being added to the Mattaponi WMA.

## Every Nest Box Counts

Virginia is an important area for wood ducks year-round. Although they have been saved from the brink of extinction, the threat of habitat loss is still an issue for this species today. The wooded wetlands of Virginia are important to both our

Proper maintenance of wood duck nest boxes is essential to ensure their usefulness. Predator guards, such as the one shown below this nest box, are also important features.

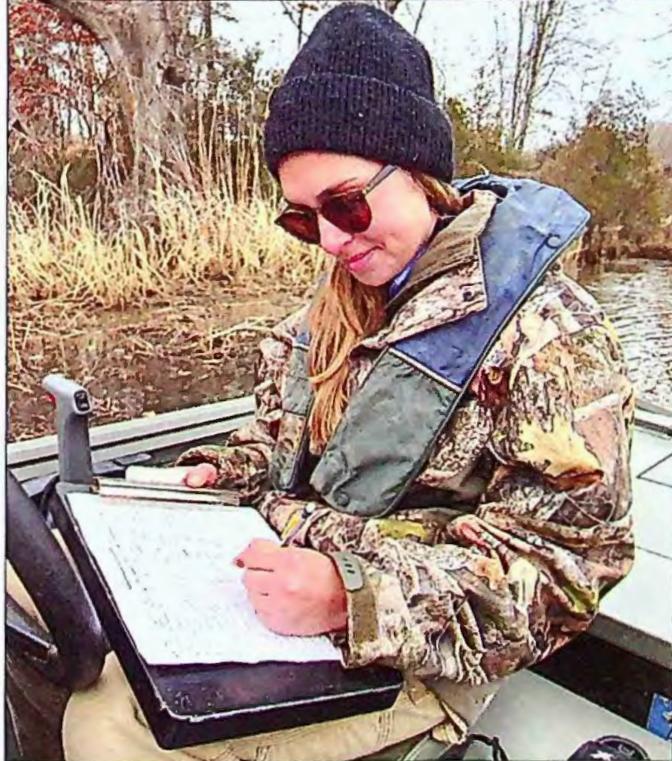


©Mike Roberts

During the spring nesting season, nest boxes are in high demand. Here, two wood duck hens fight over the residency of a box.



Refreshing the nesting material in nest boxes each winter is important.



Laura Wallace records data on the wood duck nest boxes at Chickahominy WMA.

resident wood ducks and northern populations that migrate here for the winter.

These birds are not the only species to benefit from the protection and restoration of our state's wetlands—other wildlife such as the eastern spotted salamander, little brown bat, and eastern black rail find refuge in these habitats and are also supported through wood duck conservation efforts.

In the process of maintaining the boxes, look for evidence of successful nesting attempts. There will be down feathers from the hen and fragments of eggshells left by ducklings that have hatched. Other birds such as Carolina wrens and blue birds may also be found nesting in these boxes; they leave different evidence behind such as small nest cups made of twigs and other plant materials. Knowing that such a small act can have a tremendous impact on the conservation of one of the country's most beloved waterfowl species is truly a rewarding feeling. See for yourself! ☀

*Mallory Shaw and Laura Wallace were biologist assistants for the DWR Migratory Game Bird program during 2022.*

# Living the Swamp Life



Muskrats are a rarely seen but fascinating rodent.

Story and photos by Mike Roberts

**H**istorically, Virginia's most common furbearer prompted generations of youngsters to rise from bed at dawn and head for the marshes to check their traplines before school hours. These days, few kids trap, but muskrats still roam the swamps.

My longtime appreciation for muskrats comes from years of observation, photography, and trapping of the furry creatures. Trapping furbearers is one of the most rewarding, conservation-related activities available to those people who enjoy time outdoors. Success demands a dedicated work ethic, strenuous physical activity, and the ability to solve nature's riddles. Such information might be available in reference books and online, but wading swamps and streams in search of scat, trails, and dens adds a sense of adventure to the learning process.

Muskrats (*Ondatra zibethicus*) are mammals in the order Rodentia, which all have incisors that grow throughout their lifespan—the word rodent is derived from the Latin term “rodere,” meaning “to gnaw.”

Rodents must gnaw on objects to wear down the continual growth of those long, front teeth. Without that constant wear, the tooth growth would curtail the animal's ability to feed effectively and possibly have life-threatening effects. The muskrat's pair of upper incisors overlap the lower incisors to

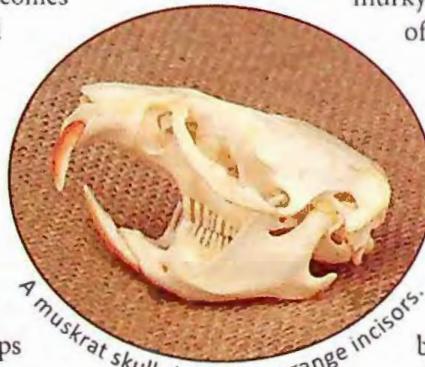
create a self-sharpening system that assists in wearing down incisor growth.

## Rodents of Usual Size

The etymology of this animal's colloquial name is somewhat murky. Some vow the word muskrat is a derivative of the Algonquian term “muscascus,” referring to the reddish coloration of its fur. Others believe the name came from the Northeastern Abenaki Tribe's word “moskwas,” the creature responsible for diving to the bottom of the ocean to dredge up mud that created the Earth, thus becoming known as the earth diver. French Canadian trappers labeled them musk beavers, while European colonists called it the musksquash, a version of the Native American designation. In time, the English version morphed into the accepted common name muskrat—namesake for the pair of glands that secrete a musk used to mark individual territories.

Muskrats are recognized as one of the most widely distributed mammalian species in North America, ranging from Northern Canada to the Gulf of Mexico, and even parts of Northern Mexico; and longitudinally from the Atlantic to the Pacific, including much of Alaska.

Close examination of the muskrat's body reveals several physiological adaptations that help it survive, including two



layers of hair. Long, coarse, guard hairs protect on the outside and a short, thick, inner layer that is practically waterproof serves as insulation from cold temperatures.

The muskrat's large, hind feet are partially webbed, plus they have long, stiff hairs growing outside the webbing, which provide more surface area to assist with swimming. The long, scaled, nearly hairless tail is flattened vertically and functions as an effective rudder and for additional propulsion. While swimming, muskrats fold their forelegs tight against the chest to reduce water resistance. The small front feet and sharp nails are adapted for digging underground plant roots, tubers, and bulbs and for excavating tunnels and dens.

Identifying muskrats can be problematic because most of their activity occurs between dusk and dawn. Averaging less than three pounds and stretching nearly 24 inches nose to tail, adult muskrats are occasionally confused with beavers. Mature North American beavers are much larger, often exceeding 60 pounds. Coloration ranges from reddish brown to black, highlighted by a grayish-white chin. Small, beady eyes on the sides of the head, and closer toward the top, detect predators even while swimming.

### Adapted for Aquatic Life

Being semiaquatic, muskrats are at home in creeks, larger streams, rivers, canals, ponds, lakes, reservoirs, and freshwater marshes, and can even tolerate coastal, brackish wetlands. These diverse habitats dictate much of the animal's behavioral activities and the availability of certain food sources.

In environs with flowing water, muskrats excavate six- to eight-inch diameter, underwater entrances and tunnels leading up to dens dug above the high-water line. Underwater entrances prevent terrestrial predators from entering. In swampy habitats, with shallow, still water, muskrats often construct mounds of vegetation (primarily cattails, bulrushes, and grasses) for lodging, typically three to four feet above the waterline. Then, the animals gnaw out cozy living quarters with an underwater entrance.

Muskrats inhabiting marshes simply dive out of their mound's underwater exit and swim along an extensive network of underwater corridors to forage. Folds of skin behind the incisors create a watertight seal, allowing muskrats to gather food with their mouths while underwater without water entering the lungs. Muskrats can remain submerged for nearly 15 minutes, long enough to locate plant material and transport it back to a dry platform inside the primary mound, or a "push up"—a smaller, vegetative mound designed for a single, feeding muskrat.

In contrast, muskrats residing near moving water must depart the security of their ground dens via tunnels and underwater exits, then climb out onto stream-side banks, where they feed on roots and tender shoots of riparian plants, as well



A muskrat builds a den with sticks, grass, and mud.

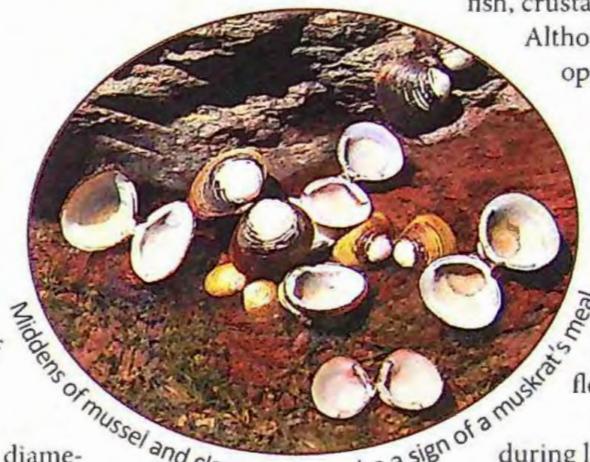
as available agricultural crops. The diet of these stream-dwellers includes not only plants, but also freshwater mussels, small fish, crustaceans, and other aquatic animal life.

Although considered herbivores, muskrats are opportunistically omnivorous.

Like most small rodents, muskrats are prolific breeders. In late winter, dominant females drive away other females and produce high-pitched whines to attract potential mates. Territorial fighting between males is commonplace, which is obvious by the numerous scars trappers discover when fleshing late-season muskrat pelts.

In Virginia, breeding activity begins during late February. More than half of the two to three annual litters of six or more kits fail to survive six months; they are preyed upon heavily by mink, weasels, foxes, coyotes, bobcats, domestic dogs, red-tailed hawks, great-horned and barred owls, and bald eagles. Add disease, parasites, and flooding to the carry-over equation and you begin to understand the perils associated with this animal's survival.

When it comes to trapping muskrats, the practice serves as a practical and rewarding means of managing an animal that, left uncontrolled, can become problematic for landowners and farmers. If you're interested, befriend a trapping mentor and, after learning the tricks of the trade, approach farmers about catching the critters excavating holes in their pond dams. That scenario can open the door to more hunting and trapping opportunities than imaginable. And as a suggestion, well before the season starts, consult the Virginia Department of Wildlife Resources (DWR) hunting and trapping regulations to become familiar with the laws governing the activity. \*



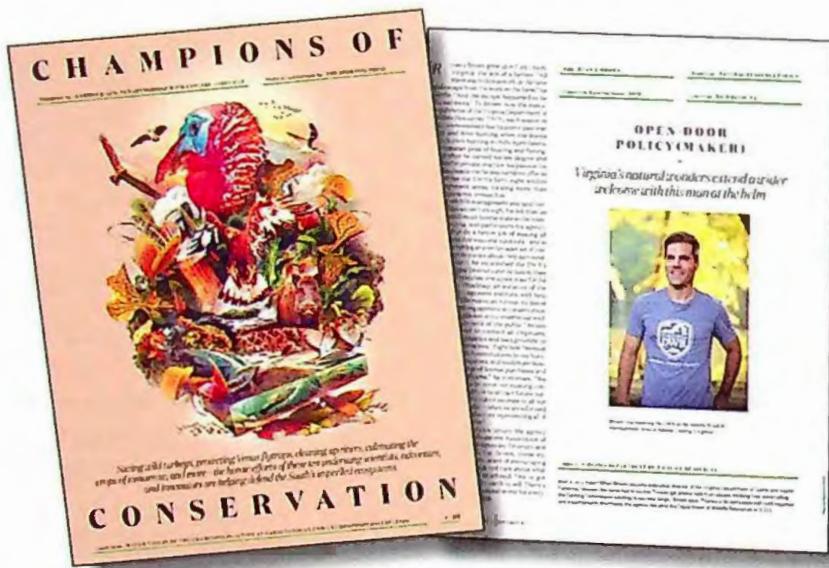
*A lifelong naturalist and wildlife photographer, Mike Roberts enjoys sharing his knowledge with others. You can contact him at: return2nature@aol.com*

# Working for Wildlife

By Molly Kirk

The mission statement of the Department of Wildlife Resources (DWR) reads that we seek to conserve, connect, and protect: Conserve and manage wildlife populations and habitat for the benefit of present and future generations. Connect people to Virginia's outdoors through boating, education, fishing, hunting, trapping, wildlife viewing, and other wildlife-related activities. Protect people and property by promoting safe outdoor experiences and managing human-wildlife conflicts. Here are a few of the many accomplishments of DWR staff in working toward those goals...

## Executive Director Honored by Garden & Gun



Ryan Brown, DWR's executive director, was recognized as one of the "Champions of Conservation" by *Garden & Gun* magazine. The recognition noted how Brown sought to expand DWR's inclusivity, aiming to do a better job of making all Virginians feel welcome in the outdoors as well as recruiting a more diverse staff of conservationists. Brown established DWR's first Office of Diversity and Inclusion and supported implementation of the Wildlife Management Institute's Relevancy Roadmap in an effort to expand the agency's reach and educate future outdoor enthusiasts about wildlife's importance.

## DWR Website Wins

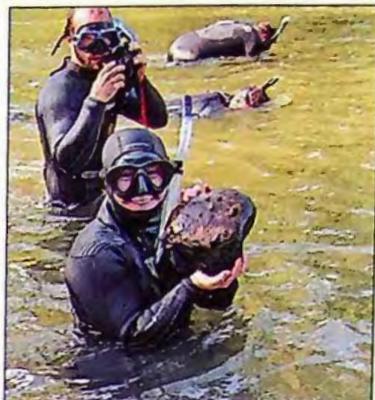
During the month of October, which was Cybersecurity Awareness Month, the Virginia Information Technologies Agency (VITA) challenged all of Virginia's state agencies to "clean the cobwebs" from their websites, looking at how well agencies updated content on their websites, fixed broken links and enhanced the overall user experience. DWR's website ([dwr.virginia.gov](http://dwr.virginia.gov)) received a score of 99.9 and earned the "Agency with the Highest Overall Score" title. DWR Digital Outreach Coordinator David Murr and Mara Snyder, digital content specialist, are also working diligently to improve the website's accessibility for all users.



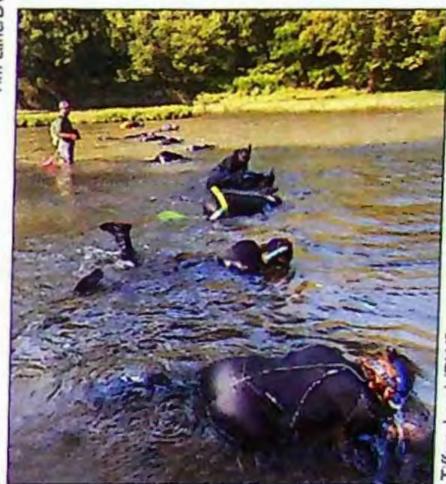
## Musselrama 2023

DWR mussel biologists led a comprehensive survey of a 200-meter reach on the Clinch River in Scott County in September and October for their annual "Musselrama" survey. DWR staff from Regions 1 and 3, and Headquarters were joined by more than 20 volunteers from partnering agencies including: Tennessee Valley Authority, The Nature Conservancy, Virginia Tech University, U.S. Fish & Wildlife Service, Canaan Valley Institute, Virginia Department of Conservation and Recreation, and Virginia Department of Transportation. In total, 21 live species were detected over the three days of searching, including seven endangered species, such as the cracking pearlymussel, dromedary pearlymussel, and slabside pearlymussel—each extremely rare in the Commonwealth. These discoveries should be viewed as a positive sign, as the river's water quality and benthic habitat is still able to support a diverse assemblage of native species. Still, total numbers of individuals are below levels observed downstream in Tennessee.

DWR intends to augment this location in the future with juvenile mussels produced at the Aquatic Wildlife Conservation Center in Marion to spread risk-of-rare species to another portion of the Clinch River. These efforts should help protect this important mussel community from future pollution events or habitat alterations. Other freshwater animals like fish, crayfish, and salamanders greatly depend on mussels' filtration capacity to keep the river's water clean and habitable. We humans also greatly depend on these animals as the river provides municipalities in the region with a primary supply of drinking water, while also supporting healthy game fish for us to catch and consume.



Tim Lane/DWR



Tiffany Leach/DWR

## A Coordinated Effort to Quell the Quaker Run Wildfire

DWR staff from a variety of agency divisions assisted the Virginia Department of Forestry (DOF) and other partners in containing the Quaker Run wildfire, which burned more than 3,900 acres in Madison County in November. The wildfire started on October 24 on private land adjacent to Shenandoah National Park (SNP) and spread to SNP and into DWR's Rapidan Wildlife Management Area (WMA).



Both by Jason Hallacher/DWR

DWR fire crew joined firefighters from the U.S. Forest Service, Madison County, and other federal, state, and local resources. The fire was declared contained on November 21. "DWR provided assistance, staff, and equipment to help fight the fire, along with institutional knowledge of the terrain and roads of the WMA," said Matt Kline, DWR region 4 lands and access manager.

"Wildfire responders from DWR exhibited a willingness to serve and seamlessly integrated with crews from other agencies to install fire lines, protect threatened structures, and ultimately contain the Quaker Run Fire. They proved to be flexible and capable firefighters and DOF is grateful for their role in containing the fire," said Bill Perry, DOF operations chief at the Quaker Run Fire.

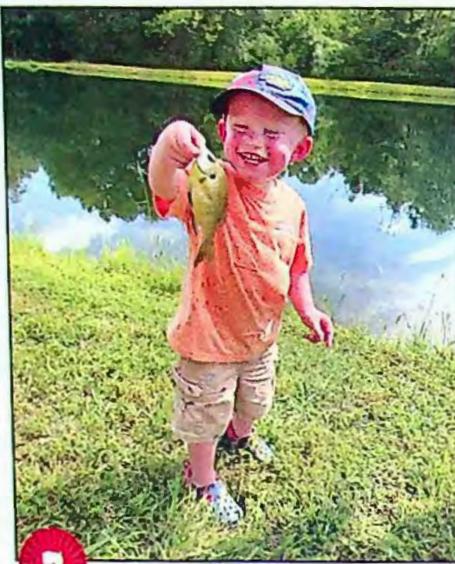
# KIDS 'N FISHING

## 2023 Photo Contest Winners

Ages 1-5



FIRST PLACE  
Dallas, age 5



SECOND PLACE  
Dawson, age 2



THIRD PLACE  
Lillian, age 5

Ages 6-10



FIRST PLACE  
Sophia, age 9



SECOND PLACE  
Sawyer, age 7



THIRD PLACE  
Rowan, age 7

Capture your child's big smile as they show off a great fish! Make sure to take a picture of your child's excitement while fishing and enter the photo in DWR and Green Top Sporting Goods' annual Kids 'n Fishing Contest. The winning photos are those that best capture the theme of "kids enjoying fishing." Each winner receives a rod and reel fishing combo and a lure and tackle assortment courtesy of Green Top Sporting Goods. So, join the fun!

Photo Contest sponsored by Virginia Department of Wildlife Resources and Green Top Sporting Goods.

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For contest rules and requirements go to: [www.virginiawildlife.gov/kidsnfishing](http://www.virginiawildlife.gov/kidsnfishing)

**DEADLINE: October 4, 2024**

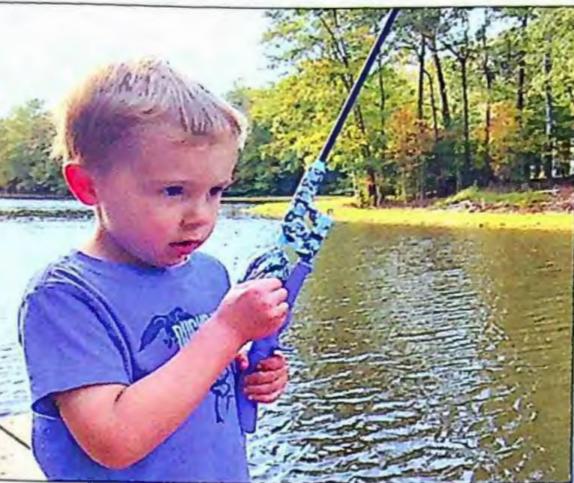


# PHOTO TIPS

Column and photos  
by Lynda Richardson



## Fishing for Memories



Lens flare (the haziness and blue line seen in the image on the right) can mar a great image, so pay attention to the sun's direction.

**A**fter looking over the hundreds of entries in our 2023 Kids 'N Fishing contest, I reminisced about the photographs my dad had taken of us kids with the numerous fresh and salt-water fish we had caught during family vacations and other fishing trips over the years. He also shared pictures of his fishing adventures, as well as trips where our mom joined him and out-fished everyone! Fishing was a much-anticipated pastime throughout my family's life, an excuse to be together outdoors that we all still look forward to today. Those old photographs bring back wonderful memories that we still talk and tease about to this day. And we're still taking pictures!

At the Virginia Angler's Club annual oyster roast in October, I spoke with member Derek Merrick as he and his son, Bennett, fished on a private pond on the property. Derek was patiently instructing his enthusiastic 3-year-old on catching panfish using worms and a large, blaze-orange float. Bennett was very interested, but wanted to keep reeling the line in.

I took a few photographs of the two, noticing Bennett's apparent concentration as he reeled. I then asked Derek what value he saw in taking photos of

his kids fishing. His answer surprised me—Derek said that Bennett loved seeing photographs of himself with fish, but seemed more interested in pictures of his father with fish. "When I shared pictures of the fish I caught with Bennett, he would study them and later, when he caught a fish, he would strike some of the same poses that I made in pictures he saw of me with a fish," Derek said. Obviously, these photographs do more than record memories.

So how can you improve your cherished, family fishing stories and create teaching moments? Here are a few tips!

1. We love our children's smiles, so make sure your child's face is visible and in good light. Watch for any shadows, hat brims, or fishing line that might be obscuring their face. If possible, move yourself or your subject into the best light before taking the photos. All sun or all shade works best.

2. As you quickly compose your photograph, don't be afraid to shoot a close-up first by using a longer lens setting like the X2 on a cellphone. Then, you can simply change to X1

(mid-range) or X.05 (wide-angle) to include the surroundings, or vice versa. Take a lot of shots, as you never know when someone will blink or the fish might leap!

3. As you shoot, watch out for distracting elements in the foreground and background. Fishing line and rods are common foreground culprits while busy, bright, colorful, or dark shapes are typical background distractions.

4. Keep your horizon lines straight and be mindful to leave room around the edges of your subject. Don't cut off the tail of the fish or the top of your subject's head.

5. Make sure the fish is clearly visible and in good light, too. This is a proud moment, so you want to make sure the fish is front and center in the photograph.

6. Sometimes having the sun behind your subject will work, but make sure you aren't experiencing lens flare, where the sun shines directly into the camera lens and creates a foggy look. If this happens, block out the sun with your kid's body or try another angle.

7. Not every photograph has to be perfectly posed. Get some action shots! Be sure to capture your kid's unique personality. Sassy, shy, confident, and goofy poses can really make a memory! I like to shoot and shoot and shoot pictures of something going on, and later edit out what doesn't work. Some of my best photographs were done like this!

8. Please teach your child safe, ethical fish-handling practices and why life jackets are important! Don't forget that your child is watching and learning from you—be a great role model! Tight lines!

*Lynda Richardson loves photographing wild things all over the world. She is the art director of this magazine.*



## A Walk in the Woods

Column and photo  
by Mike Roberts

For outdoor enthusiasts who explore Virginia's fields and forests to watch and admire birds, woodpeckers offer a special opportunity to witness how animals are adapted to fill particular niches within the natural environment. Of the seven species of woodpeckers that breed across our commonwealth, the northern flicker is unique to all the others.

Woodpeckers, with the exception of two North American species, have a zygodactyl arrangement of toes, meaning two forward and two backward. These long, strong toes, aided with sharp toenails, allow the birds to cling to the vertical surfaces of trees while searching for insect larvae and excavating nest cavities. In addition, stiff tail feathers, supported by large, strong, tail muscles, help prop the bird as it shimmies up tree trunks. From those physiological perspectives the northern flicker is no exception—they, too, nest in chambers drilled in the softer woods of dead trees and sometimes hunt insects beneath the decaying bark of snags and in fallen, rotting logs.

But while most woodpeckers depend on extracting insects from under the bark of trees, the colloquial "yellow-hammer" is primarily a ground-feeder, probing the soil for their main source of protein—ants and beetle larvae. While other species, like the red-bellied and red-headed woodpeckers, might occasionally forage for insects and nuts on the forest floor, flickers are as much at home on the ground as robins.

What's more, the northern flicker's bill is shaped to effectively penetrate the soft, top layers of soil. Rather than a straight, thick bill strictly designed for chiseling wood (typical of other

woodpecker species), the flicker's bill is slender and slightly curved. Coated with sticky saliva and protruding over two inches beyond the tip of the bill when fully extended, this avian's extremely long tongue is perfect for extracting ants and their eggs from underground tunnels and chambers.

Individuals, pairs, and even small groups of flickers can often be observed hopping about in yards, fields, pastures,



and along the edge of forestlands. And while it's true that ants are their primary food source, flickers opportunistically eat other insects. Come late autumn and winter, however, the diet includes wild grapes and the berries of dogwood, hackberry, sumac, and especially those of poison ivy.

The northern flicker is the most widespread of all North American woodpecker species, ranging from the Atlantic coast to the Pacific coast and from the treeline south of the Arctic tundra southward through Central America. In the colder, northern regions, flickers migrate to warmer climates during winter, whereas populations in more temperature-friendly

## When Is a Woodpecker Not Quite a Woodpecker?

environments are permanent residents.

There are two separate subspecies of the northern flicker: the yellow-shafted east of the Rocky Mountains and the far north country and the red-shafted that ranges through the Rocky Mountains westward to the coastline and north into much of Alaska. Distinctly visible in undulating flight, the undersides of the yellow-shafted's wing feathers and tail feathers are golden-yellow and serve as a primary means of identification. Males have a brown face and a black mustache, as well as a red crescent on the nape; females lack the facial mustache. The undersides of the aptly named red-shafted's wing feathers and tail feathers are orangish-red; the male's gray face is highlighted with a deep-red mustache. Both subspecies have a black breast bib and white rump patch. In areas where the two subspecies overlap, there are intergrades with several color variations.

If your favorite time of the year for taking a walk in the woods is during the springtime, listen for the male flicker's territorial drumming from a dead limb with impeccable resonance, followed by his repetitious "wuk wuk wuk wuk wuk" proclamations. And should one "adopt" your home's metal gutters or fascia boards for the same purpose, and regularly rouse you from early morning sleep, keep in mind these handsome birds are protected by the Federal Migratory Bird Treaty Act.

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*A lifelong naturalist and wildlife photographer, Mike Roberts enjoys sharing his knowledge with others. You can contact him at: return2nature@aol.com.*

Column by Stephen Living



## Enhance Your Habitat at Home for Winter Wildlife

Winter weather is upon us, for some more than others depending on where in Virginia you find yourself. You may be spending more time indoors than you do during the milder months, but even when the cold winds blow, there's still an abundance of wildlife using the habitats around you.

We think of birds migrating south for the winter, but some species will migrate south to Virginia or just stick around all year long. We'll see wintering ducks on our ponds, lakes, and rivers and the Chesapeake Bay and even flocks of geese descending on farm fields. Your own space will also host a variety of winter residents. Putting out a bird feeder is often the first thought for supporting winter birds. Properly maintained and cleaned bird feeders can be a rewarding way to view wildlife, but should only be a part of your solution. Providing a Habitat at Home is the best way to support birds and other wildlife. This includes ensuring that there are natural food sources as well as shelter and water to help sustain wildlife year-round.

Birds like dark-eyed juncos and white-throated sparrows are common winter residents throughout Virginia. You aren't likely to see these birds perched on bird feeders, as they prefer to feed on the ground. Another striking (but less common) winter visitor is the fox sparrow. This bird is large for a sparrow, with bold, rusty-red coloring. Fox sparrows and other birds often search for food by kicking through the leaves, another great reason to "leave the leaves"!

Another winter visitor is the colorfully named yellow-bellied sapsucker. This small woodpecker gives a distinctive cat-like call and feeds by drilling a

series of shallow holes into trees to feed on sap. These tiny holes heal quickly and don't generally cause problems for healthy trees or shrubs. Insects will sometimes get stuck in the sap, providing some bonus protein. Other winter visitors like ruby- and golden-crowned kinglets and yellow-rumped warblers are happy to take advantage of the sapsucker's work and will feed at these sap wells.



Northern mockingbird on a heated bird bath.



American robin feeding on crabapples.

Finding water when temperatures drop below freezing can be a special challenge for birds. Small backyard ponds can be a great source, especially if they have moving water or are deep enough to keep from freezing solid. Bird baths can help too. There are a variety of heaters meant to keep bird baths ice free. Check your local bird feeding or hardware store. Dark surfaces on bird baths

can also help absorb heat from the sun. Shallow bird baths freeze much more quickly, so be sure to keep them full.

Cover is another important resource for our winter wildlife. Leaving the stalks, stems, and dried flower heads in your landscape provides cover and places to look for seeds and insects. If you're lucky enough to have a meadow or grassland area, hold off on mowing, burning, or discing until the end of winter to continue to provide cover through the season. Evergreen trees and shrubs provide places to get out of the cold. Some serve double duty and provide food as well. American holly is a favorite winter food for many birds and will attract mixed flocks of robins, cedar waxwings, bluebirds, and hermit thrushes. The berries of the wax myrtle, an evergreen shrub, are a favorite of the yellow-rumped warbler (lovingly nicknamed "butter-butt"). Note that both holly and wax myrtle have separate male and female plants—you need both around if you want berries.

Some birds will escape the cold in natural tree cavities or even in bird houses. You can help by maintaining snags (where safe) or winterizing bird houses. To winterize a bird house, seal any ventilation holes and place it in a sheltered, sunny spot with the opening facing away from the prevailing wind. Specialized winter roost boxes will have entrance holes located towards the bottom of the box to trap heat.

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Stephen Living, the DWR habitat education coordinator, is a biologist and naturalist with a lifelong love of wildlife and nature that began in the woods and streams of his childhood.

# Fare Game with... WENDY HYDE

Ducks and geese are what most people associate with waterfowl hunting. Flocks of noisy, migrating birds scattered across corn fields, ponds, and rivers. But swans? Perceptions about swans have been influenced and romanticized through stories for centuries. Many people view them as a symbol of elegance, beauty, and tranquility because of their gracefulness and pure white color.

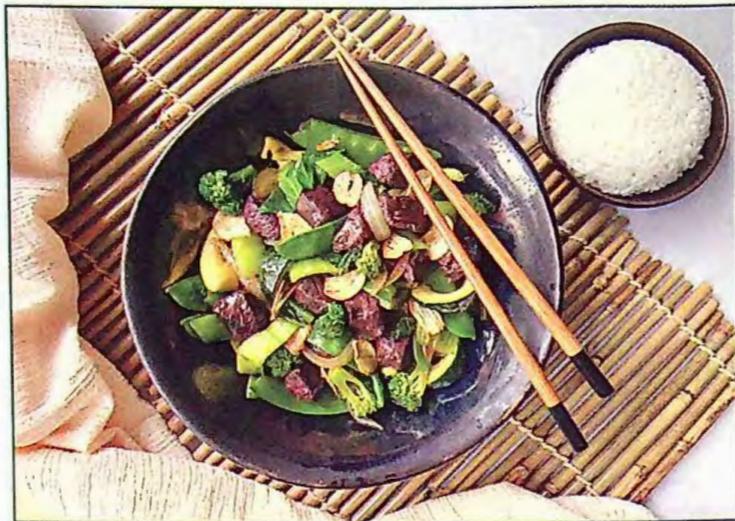
Tundra swans are the most abundant North American species. A number of states offer regulated hunting seasons for this species, and Virginia issues a limited number of tundra swan hunt permits annually. Two other species inhabit Virginia's waters: rare migratory trumpeter swans are protected under the Federal Migratory Bird Treaty Act and non-native mute swans are not afforded protection and considered a nuisance species. The largest of all waterfowl, swans are herbivores with a diet similar to geese, and their meat is comparable in taste and texture. This quick recipe for a stir-fry can be made with any dark meat—including goose and duck—and would also work well with venison.

## Swan Stir Fry with Green Vegetables

Serves: 2

Time: 1 hour

10-12 oz. boneless, skinless swan breast, 1" cubes  
½ tsp. Kosher salt  
⅛ tsp. black pepper  
2 Tbsp. unsalted butter  
  
¼ c. vegetable oil, divided  
5 medium garlic cloves, divided (½ tsp. finely minced, the remaining sliced very thin)  
3 oz. yellow onion, sliced ¼" thick  
3 oz. fresh snow peas  
3 oz. fresh, small broccoli florets  
3 oz. seeded zucchini, sliced ½" thick  
2 small baby bok choy, sliced ½" thick  
  
1 c. beef stock  
1 Tbsp. Shaoxing wine (can substitute dry sherry)  
1 Tbsp. light soy sauce  
1 Tbsp. oyster sauce (substitute 2 tsp. Worcestershire sauce)  
½ tsp. of minced garlic (from above)  
¼ tsp. grated fresh ginger  
1 Tbsp. cornstarch  
1 tsp. granulated sugar



Season meat cubes with salt and pepper, tossing to coat thoroughly; set aside. In a medium bowl, whisk together the beef stock, wine, soy sauce, oyster sauce, cornstarch, and sugar until no lumps remain; set aside.

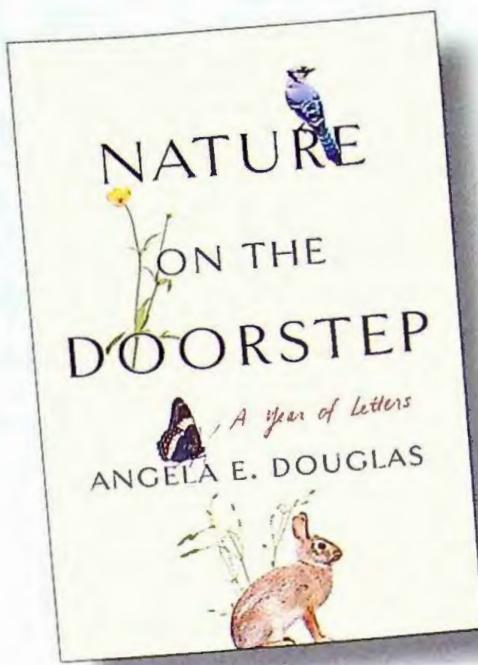
In a wok or large sauté pan, heat 1 Tbsp. of oil over medium heat until shimmering. Add garlic slices and cook until light golden brown, about 2 minutes. Transfer garlic to a paper towel-lined plate to drain.

Pat meat cubes dry with a paper towel. Increase heat on wok to medium-high, add the butter and heat until bubbling. Carefully add the meat and separate the pieces. Sear about 1 minute until it begins to brown, quickly turn all the pieces over and brown on second side. Cut one piece in half and check the center—it should be very light red. Cook time should be no more than three minutes. Remove immediately onto a plate and let rest; meat will continue to cook as it rests.

Add 2 Tbsp. of oil to the wok and heat until shimmering. Add onion and cook one minute. Add broccoli, snow peas, and zucchini and cook, stirring constantly, until vegetables are just beginning to get tender. Add bok choy, toss to combine, and cook until stems are tender-crisp. Transfer to a medium bowl and set aside.

Add remaining tablespoon of oil to the wok, add garlic and ginger and cook 30 seconds until fragrant. Add the beef stock mixture and cook, stirring constantly, until sauce thickens, becomes transparent, and bubbles. Return vegetables and meat to the sauce, toss to coat then immediately remove from heat. Serve in bowls over steamed white rice, garnishing each bowl with the fried garlic slices.

*Wendy Hyde lives on the Northern Neck of Virginia with her husband and two dogs. Visit her website at [www.girlgamechef.com](http://www.girlgamechef.com) for more recipes; find her on Instagram as @girlgamechef.*



## Excerpted From...

### *Nature on the Doorstep: A Year of Letters*

By Angela E. Douglas 2023  
Cornell University Press  
235 pages  
[cornellpress.cornell.edu](http://cornellpress.cornell.edu)

*"Nature on the Doorstep" reveals the simple pleasures of paying attention to the natural world in one's own backyard over the course of a year. In weekly letters to friends, Angela E. Douglas shares the joys and curiosities of a decidedly ordinary patch of green in upstate New York cultivated through the art of "strategic neglect"—sometimes taking a hand to manage wildlife, more often letting nature go its own way.*

**A** part from their interest in the newly discovered bird nests, the main preoccupation of the gray squirrels

has been to forage for fruits and nuts. The pickings in the backyard have been rather middling this year. The serviceberry, despite its wonderful flowers in April, has produced not a single berry. The robins and squirrels have been denied that three-day bonanza of every previous year when they stripped the tree down to the very last berry. And our black walnut has had rather few fruits. The black walnut fruit is big, about two inches across (that's bigger than a ping-pong ball), and a wonderful resource for squirrels. Somehow, a squirrel can hold this enormous nut in its jaws as it races to a suitable spot for burying. Squirrels collect the fallen nuts and are also perfectly willing to harvest them before they fall. I have seen squirrels, clasping a narrow twig high in the canopy by their hind feet, while manhandling a nut into their mouth, and then maneuvering back along the branch to the trunk, and careering down at breakneck speed to the ground.

It seems that the black walnut tree across the road has been more productive. Our squirrels dice with death crossing the road, the return journey laden with a bright-green nut. The alternative route is to chase along the overhead electricity wires that cross the road. This is very much the path less traveled by, probably because the squirrels are obviously unbalanced by their front-heavy load. On one occasion, a squirrel had safely crossed the road and had obviously identified the flower bed at the front of our house as the perfect burial site, but then suddenly veered off to climb the apple tree. It parked the enormous nut in the fork of a high branch, ran down, and went back across the road. And then we saw that another

squirrel was busy with a nut close to the house. I guess, in the cut-and-thrust of the squirrel world, it is best not to let the other guy know where you are burying your walnut. The nut didn't stay in the tree for long, so the squirrel must have remembered to collect it later.

Just now, you can find pumpkins and squashes in serried ranks in every grocery store and roadside stall. Until very recently, our backyard sported a single squash, too. Recall the many cu-curbit seeds that survived our composting and germinated during the summer, giving us those big yellow flowers. Well, this led to the start of just one squash fruit. I had images of a celebratory acorn squash dinner later this month. But, no, one day the baby squash had disappeared. More correctly, it had been ripped off, and moved about five feet from the plant. We left it untouched, and by the next day it was gone. It must have been a squirrel, who needed some serious uninterrupted time to heave this heavy load to a suitable place for a long, satisfying meal.

*From "Nature on the Doorstep: A Year of Letters," by Angela E. Douglas, a Comstock Publishing Associates book published by Cornell University Press. Copyright (c) 2023 by Cornell University. Reprinted by permission of the publisher.*



Shutterstock/Alicja Korbinska



# OUT & ABOUT



January 13-14

## Virginia Fly Fishing & Wine Festival

[vaflyfishingfestival.com/](http://vaflyfishingfestival.com/)

January 19-21

## Richmond Fishing Expo

[richmondfishingexpo.com/](http://richmondfishingexpo.com/)

January 27- February 4

## Virginia Beach Winter Wildlife Festival

[parks.virginiabeach.gov/events-information/special-events/winter-wildlife-festival](http://parks.virginiabeach.gov/events-information/special-events/winter-wildlife-festival)

February 3

## Youth & Veterans Waterfowl Hunting Day

[dwr.virginia.gov/hunting/youth/](http://dwr.virginia.gov/hunting/youth/)

February 16 -19

## Great Backyard Bird Count

[birdcount.org/](http://birdcount.org/)

March 9

## National Archery in the Schools Program (NASP) State Tournament

[nasptournaments.org](http://nasptournaments.org)

# HOW YOU CAN HELP WILDLIFE

## GIVE THAT TREE A SECOND JOB

By Stephen Living/DWR  
After the hubbub of the holidays, we return to our routines and pack away decorations until next year. That tree that you kept watered through the holidays starts to drop needles, and it's time to take it down. What to do with it? It seems a shame to send your once-festive tree to a landfill. If you're lucky, your community may grind and repurpose trees as mulch or compost. But there may be an even better way to keep your tree around and continue to enjoy it—add it to your Habitat at Home\*.

During the winter months, cover can be a critical habitat need for wildlife in your back yard. The evergreen boughs of your Christmas tree can provide a place for wildlife to hide, escaping predators and cold weather. After removing all of your decorations, hooks, and garland, you can lean your tree up against a sturdy support or lay on the ground in an out-of-the-way corner of your yard. If you have the space, you can use the tree as a base for a larger brush pile, adding limbs and branches from trimming and pruning through the year. Avoid leaving it right next to your house—you don't want to inadvertently invite wildlife neighbors inside!



Shutterstock/Ryzhkov Oleksandr

## PICS FROM THE FIELD



Mendbayar Dashdavyn

**Virginia Wildlife**  
Art Director Lynda Richardson, journeyed to Mongolia last fall to watch the 24<sup>th</sup> Annual Golden Eagle Festival in Bayan-Olgii. She shared the January/February 2023 issue of the magazine with festival winner and 14-year-old eagle huntress, Ay Moldir Daiynbek. Lynda's guide filled Ay in on what the cover story said about Virginia's golden eagles.





VIRGINIA DEPARTMENT  
OF WILDLIFE RESOURCES

# 2023 Annual Report



Meghan Marchetti/DWR

This is an abbreviated version of DWR's Fiscal Year 2023 Annual Report. To see a PDF of the full 2023 Annual Report: [virginiawildlife.gov/annual-report-2023](http://virginiawildlife.gov/annual-report-2023)

**T**here's no ordinary day for the Virginia Department of Wildlife Resources (DWR). At any given moment across the Commonwealth, DWR field employees could be capturing a bear for research, raising trout in a hatchery, enforcing Virginia's laws, igniting a prescribed fire, educating the public about wildlife, adding gravel to a road, evaluating a construction site's impact on an endangered species, or analyzing data gathered from tagged fish. And back at DWR headquarters in Henrico, staff supports those efforts with mapping, technology, accounting, human resources, and customer service expertise.

It's all part of DWR's mission to lead wildlife conservation and inspire people to value the outdoors and their role in nature. The outdoors are better together, and DWR aspires to welcome all Virginians into outside spaces to recreate safely, knowledgeably, and successfully. The incredibly varied work that DWR's approximately 450 full-time employees do supports not only healthy habitats for wildlife, but also safe, accessible recreational opportunities for the public to enjoy wildlife and the outdoors.

## THE VIRGINIA DEPARTMENT OF WILDLIFE RESOURCES' MISSION IS TO:

- **Conserve** and manage wildlife populations and habitat for the benefit of present and future generations.
- **Connect** people to Virginia's outdoors through boating, education, fishing, hunting, trapping, wildlife viewing, and other wildlife-related activities.
- **Protect** people and property by promoting safe outdoor experiences and managing human-wildlife conflicts.

## EACH DIVISION WITHIN DWR WORKS TO CONSERVE, CONNECT, AND PROTECT IN THEIR OWN WAY. ANNUALLY, DWR WORKS TO:

- Maintain **78** Wildlife Management Areas (WMA) and Wildlife Conservation Sites (WCS) that comprise nearly **250,000** acres of public land
- Manage fisheries in more than **25,000** miles of cold- and warm-water streams
- Maintain fishing and boating access to more than **175,000** acres of lakes and reservoirs
- Educate more than **30,000** students in safe boating and hunting
- Enforce hunting, trapping, fishing, boating, and other wildlife laws for both resource protection and public safety
- Invite extensive citizen participation in the crafting of wildlife regulations
- Offer technical support to the public for wildlife, fisheries, and their habitat
- Promote safe outdoor recreation



# Conserve. Connect. Protect.

DWR leads the conservation and management of healthy terrestrial and aquatic wildlife resources, including for both common and at-risk birds, fish, mammals, reptiles, freshwater mussels and other aquatic invertebrates, and amphibians—and healthy wildlife habitats for the benefit of present and future generations. A small sampling of projects from Fiscal Year 2023 follows—please see [virginiawildlife.gov/annual-report-2023](http://virginiawildlife.gov/annual-report-2023) for more.



## Bringing Elk Back to Virginia

The restored elk herd in Southwest Virginia offers a variety of recreational opportunities from wildlife viewing via tours, platforms, and live-stream cameras to elk hunting.



## CREATION OF COASTAL FOREST WMA

DWR's purchase of land on the Eastern Shore of Virginia and creation of the Coastal Forest Wildlife Management Area will greatly improve habitat for wildlife, provide highly desirable public access on more than 8,600 acres, and support coastal resiliency.



## HISTORIC FRESHWATER MUSSEL RESTORATION EFFORTS

DWR and partners successfully propagated and stocked multiple species, some endangered and threatened, of freshwater mussels into Virginia rivers.

## Renovated Front Royal Fish Hatchery

Extensive renovations to the Front Royal Fish Cultural Station were completed in 2023, equipping the facility with state-of-the-art equipment and resources to maximize the production and stocking capability of both warm- and cold-water fish.





## Putting Fish in Waters

### DWR's five cold-water fish production facilities stocked nearly 1 million trout:

between fall 2022 and spring 2023 into 200 different locations. DWR's four warm-water fish production facilities stocked 3.5 million fish.

■ Rainbow trout 524,425	■ Tiger trout 17,627	■ Hybrid striped bass 155,000
■ Brown trout 100,991	■ Walleye and saugeye 1.8 million	■ F1 largemouth bass 100,000
■ Brook trout 147,114	■ Striped bass 1.15 million	■ Channel catfish 90,000
	■ Black crappie 300,000	■ Muskellunge 2,000



## Ensuring Public Access

DWR maintains 230 boating access sites across the Commonwealth and nearly 250,000 acres of land in Wildlife Management Areas (WMA) and Wildlife Conservation Sites (WCS). In addition, the agency is responsible for renovations and repairs on 39 dams, nine state hatcheries, and other agency-owned facilities.

## VOLUNTEER CONTRIBUTIONS

DWR's Volunteer Program contributed more than 5,700 work hours to the agency, resulting in a savings of more than \$114,000.



## GIVING SEABIRDS A HOME

DWR continued a project begun in 2020, providing safe nesting habitat for Virginia's largest colony of migratory seabirds at Fort Wool and anchored barges after the displacement of their nesting grounds due to construction at the Hampton Roads Bridge-Tunnel site.

## VIRGINIA BREEDING BIRD ATLAS 2

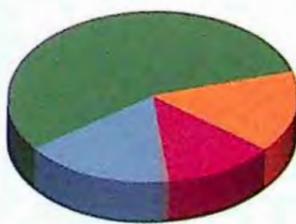
A collaborative project between DWR, the Virginia Society of Ornithology, and the Conservation Management Institute at Virginia Tech, the Virginia Breeding Bird Atlas 2 is one of the largest volunteer-based bird survey projects to take place in Virginia and has produced 725,000 breeding bird records through the efforts of more than 1,400 volunteers.



## DWR Conservation Police in Action

- Conducted 20,445 patrols
- Responded to 5,531 violation calls
- Responded to 4,493 wildlife nuisance calls
- Responded to 243 environmental issue/fish kill calls
- Received 5,734 wildlife crimeline reports

**TOTAL CALLS: 53,235**





# Conserve. Connect. Protect.

DWR connects people to Virginia's outdoors through education and information about boating, fishing, hunting, trapping, wildlife viewing, and other wildlife-related activities. Communication efforts focus on safety and enjoyment of wildlife resources by all Virginians. A small sampling of projects from Fiscal Year 2023 follows—please see [virginiawildlife.gov/annual-report-2023](http://virginiawildlife.gov/annual-report-2023) for more.



## Explore the Wild

DWR staff planned, developed, and implemented a robust database of public lands opportunities, amenities, and features including properties owned and/or managed by federal, state, county, or municipal governments that invite access for a variety of outdoor recreation uses. Available on both the DWR website and mobile app, Explore the Wild provides a single online destination to connect the public with new places to enjoy boating, fishing, hunting, hiking, paddling, or wildlife viewing.

## HELLBENDER AS HERO

DWR's **Restore the Wild** initiative, a membership concept as a conservation fund earmarked for habitat restoration projects, held its third annual Restore the Wild Artwork Competition featuring the eastern hellbender. The contest was able to display all 139 artwork entries at a gallery for public display. Winning artworks were reproduced into products used to promote DWR and Restore the Wild's mission.



## Finding and Training the Next CPO Generations

The DWR Law Enforcement division undertook a comprehensive recruitment process for a new class of Conservation Police Officers (CPOs), engaging with potential recruits in diverse settings and contexts. The recruits trained in the Basic Academy for 26 weeks, and 22 recruits graduated the 12th Academy and were sworn in as CPOs, then were assigned to training officers to continue their training.



## LIVE-STREAMING WILDLIFE

Coordination between Outreach and Wildlife staff provides four different live-streaming cameras—falcon, elk, shad, and marsh—featuring different wildlife species and habitats, expanding wildlife-viewing opportunities for Virginians and beyond.

## CREATING REWARDING HUNTING EXPERIENCES

The 2023 spring turkey season resulted in a harvest of 24,447 turkeys, the highest spring turkey harvest ever recorded in Virginia. Although many states within the region are reporting declining spring turkey harvests and populations, Virginia seems to be a bright spot regionally.





## National Archery in the Schools Program

DWR hosted the 14<sup>th</sup> annual Virginia National Archery in the Schools Program (NASP) Tournament/IBO 3D Challenge, with more than 600 archers competing for more than \$30,000 in educational scholarships. Virginia NASP is growing, and proudly offered archery instruction to more than 48,000 students in FY23.

### CONNECTING COMMUNITIES

A focus has been made on seeking out and prioritizing partnerships with outdoor affinity organizations and personalities to connect underrepresented constituencies with the work of DWR. The Outreach division and the Office for Diversity and Inclusion initiated ongoing relationships with ARTEMIS Sportswomen, the Upper Mattaponi Nation, Hmble Hstle Clothing, Blue Sky Fund, Rivah Sistah, and Outdoor Afro. Events helped connect groups to DWR, including the Outdoor Afro/DWR Field Day, in which 30 members of the DMV chapter of Outdoor Afro participated in a field day featuring archery, fishing, hikes, and wildlife viewing.

### Virginia Wildlife Grant Program

Purchases through DWR's e-store generated \$138,475 in revenue for the Grant Program, which connects underserved youth to the outdoors by funding activities in hunting and shooting sports, fishing, archery, paddling, and wildlife viewing. In FY23, the program approved 14 awards totaling \$167,600 to create these opportunities.



### Meet and Greet

DWR Outreach and Law Enforcement established an educational presence at a wide variety of events across the state, including National Night Out, Elk Fest, the Virginia State Fair, the Osprey Festival, the Winter Wildlife Festival, the Great Dismal Swamp Birding Festival, the Green Top Outdoor Expo, Riverrock Monsters of the James fishing tournament, the Virginia Fly Fishing and Wine Festival, the Richmond Fishing Expo, and many local events.

### SERVING THE CUSTOMERS

The DWR Customer Service Center and Boat Registration/Titling section assist more than one million boaters, hunters, anglers, and wildlife enthusiasts annually, fulfilling administrative needs and wildlife resources questions.



87,000  
calls



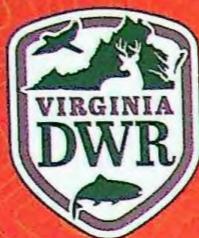
8,800 walk-in  
customers



10,000  
emails

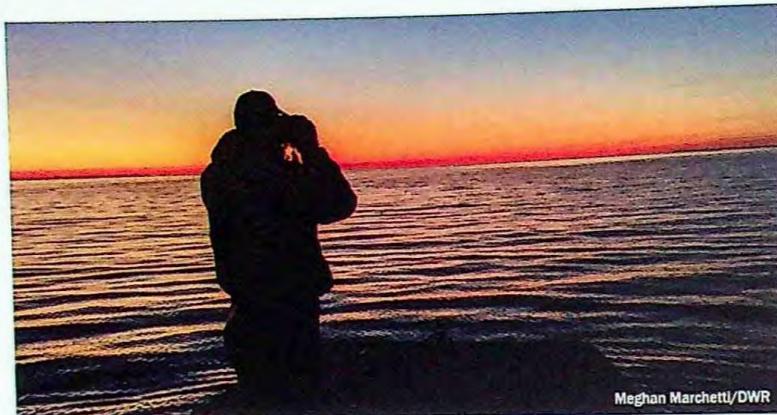


1,500 written  
correspondences



# Conserve. Connect. Protect.

DWR protects people, property, and natural resources by promoting safe outdoor experiences and managing human-wildlife conflicts through both law enforcement and education efforts. We also enforce the Commonwealth's wildlife and boating laws and regulations. A small sampling of projects from Fiscal Year 2023 follows—please see [virginiawildlife.gov/annual-report-2023](http://virginiawildlife.gov/annual-report-2023) for more.



Meghan Marchetti/DWR

## NAWLEA Leadership Program

DWR's Colonel John J. Cobb was selected to serve as the inaugural chairman of the board of the North American Wildlife Law Enforcement Accreditation (NAWLEA), with Captain Rob Ham chosen as the assistant program director and retired Chief Bobby Mawyer, currently a DWR consultant, selected as one of two NAWLEA training coordinators for the program. The creation of NAWLEA in 2022 assumes a pivotal role within the domain of conservation law enforcement by establishing and upholding contemporary standards that mirror the latest professional practices to not only enhance the efficiency and efficacy of law enforcement services, but also to incorporate a strategic approach to addressing and mitigating liability for both the agency and its personnel.

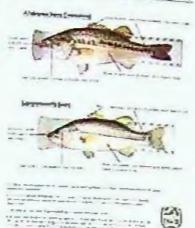


Meghan Marchetti/DWR

## Mitigating Human/Wildlife Conflict

DWR Wildlife division staff work extensively with a variety of localities and landowners to address a breadth of human/wildlife conflict issues. DWR and the U.S. Department of Agriculture (USDA)-Wildlife Services continue to collaborate in administering the Virginia Wildlife Conflict Help-line, a central and timely source of science-based wildlife information for Virginia residents that fields more than 15,000 calls annually.

### DO YOU KNOW THE DIFFERENCE?



### RESPONDING TO INVASIVE AQUATIC SPECIES

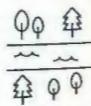
DWR's Aquatics division is working on several initiatives and efforts, including monitoring, research, and outreach, to limit the negative impact of invasive species, including Alabama bass, northern snakehead, and blue catfish.



### THE DWR CONSERVATION POLICE PROTECT:



More than 8 million Virginia residents



250,000 acres of DWR Wildlife Management Areas



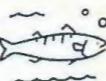
95 counties



27 major lakes



371 rivers & creeks



3,500 miles of trout streams



68,626 acres of State Forest land



1.6 million acres of National Forest land

# KEEPING HUNTERS AND BOATERS SAFE THROUGH EDUCATION

The Hunter Education Program staff and volunteers train about 10,000 hunter education students annually in Basic Hunter Education, Virginia Bowhunter Education, and Beyond Basic Hunter Education classes. The Boating Safety Program works to keep the operators and passengers of more than 225,000 registered motorboats safe and informed. More than 23,000 students attended a boating safety education course (classroom and online) in FY23. Both education programs coordinate with the information side of the agency to provide boating safety messages through email newsletters, social media, and the DWR website.



## PLANNING WILDLIFE CORRIDORS

DWR led a multi-agency initiative to develop the Wildlife Corridor Action Plan, one of the first statewide plans with a clear emphasis on protecting vital wildlife habitat corridors and reducing wildlife-vehicle conflicts, such as collisions, to promote driver safety, improve wildlife corridor connectivity, and advance mutual benefits.



## Targeting Illegal Wildlife Trade

DWR Wildlife staff and Conservation Police work to combat the illegal trade of reptiles and amphibians, which is a large and growing problem. In 2023, Conservation Police covert agents seized 750 animals that had an overseas market potential value of more than \$150,000.



## MANAGING WILDLIFE DISEASE

Managing wildlife disease continues to be an expanding program within DWR's Wildlife division. DWR employs a Wildlife Veterinarian and a Wildlife Health Coordinator, while wildlife biologists and staff perform direct disease management via surveillance/testing programs and regulatory actions as well as proactively developing and conducting public outreach efforts to raise awareness of wildlife diseases and compliance with management actions that can help mitigate disease spread.

## Law Special Operations Unit Adds Capabilities

The Special Operations Unit within DWR law enforcement encompasses a variety of specialized divisions, including the division's K9 units, the Marine Fraud and Theft Unit, and the Covert Unit, each contributing distinct skills such as man-tracking, hunting and boating incident teams, and the Honor Guard, to enhance the division's capabilities.

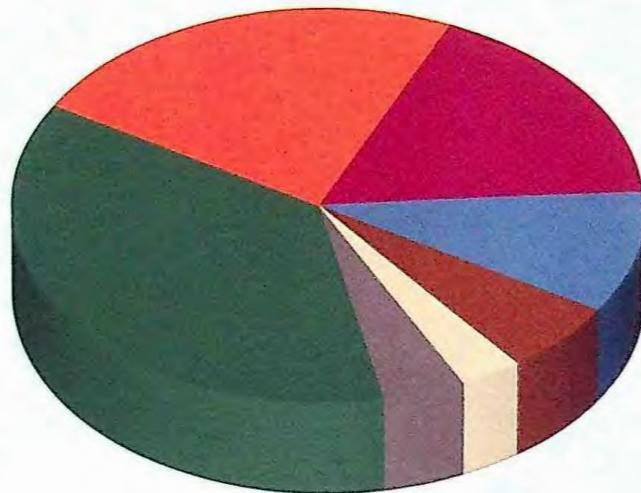
# How We're Funded

The Department of Wildlife Resources (DWR) largely exists through non-general fund revenues. We operate from within multiple restricted funds to support unique programs and responsibilities in Law Enforcement, Wildlife, Aquatics, Boating, Nongame and Endangered Species, Capital Programs, and Outreach, as well as administrative support functions in Human Resources, Planning and Finance, and the Executive Office.

## PRIMARY REVENUE SOURCES THAT SUPPORT DWR

\* as a percentage of annual revenue

- Hunting, Fishing, and Trapping Licenses, Permits, and Stamps **37%**
- Federal Grants for Wildlife and Aquatics Support **23%**
- Sales Tax on Outdoor Equipment for Hunting, Fishing, and Wildlife Watching (HB38) **17%**
- Watercraft Sales and Use Tax **10%**
- Boat Registration and Titling Fees **6%**
- Federal Grants for Boating Support **3%**
- Miscellaneous **4%**



## ECONOMIC CONTRIBUTIONS IN VIRGINIA



### HUNTING

510,000 hunters spent \$409 million on hunting-related equipment expenditures



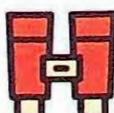
### FISHING

1.4 million anglers spent \$350 million on fishing-related equipment expenditures



### RECREATIONAL MOTORIZED BOATING

247,824 registered boats resulted in \$623 million spent on boating-related equipment expenditures

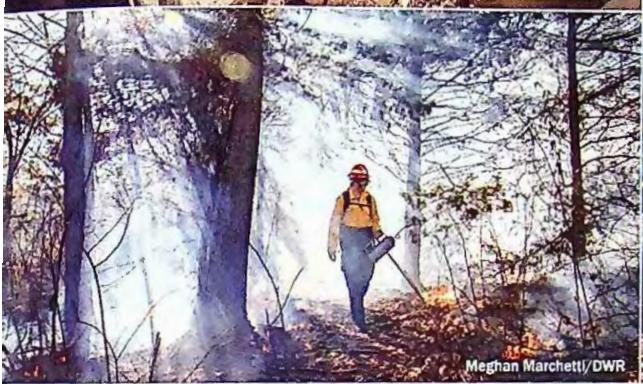


### WILDLIFE WATCHING

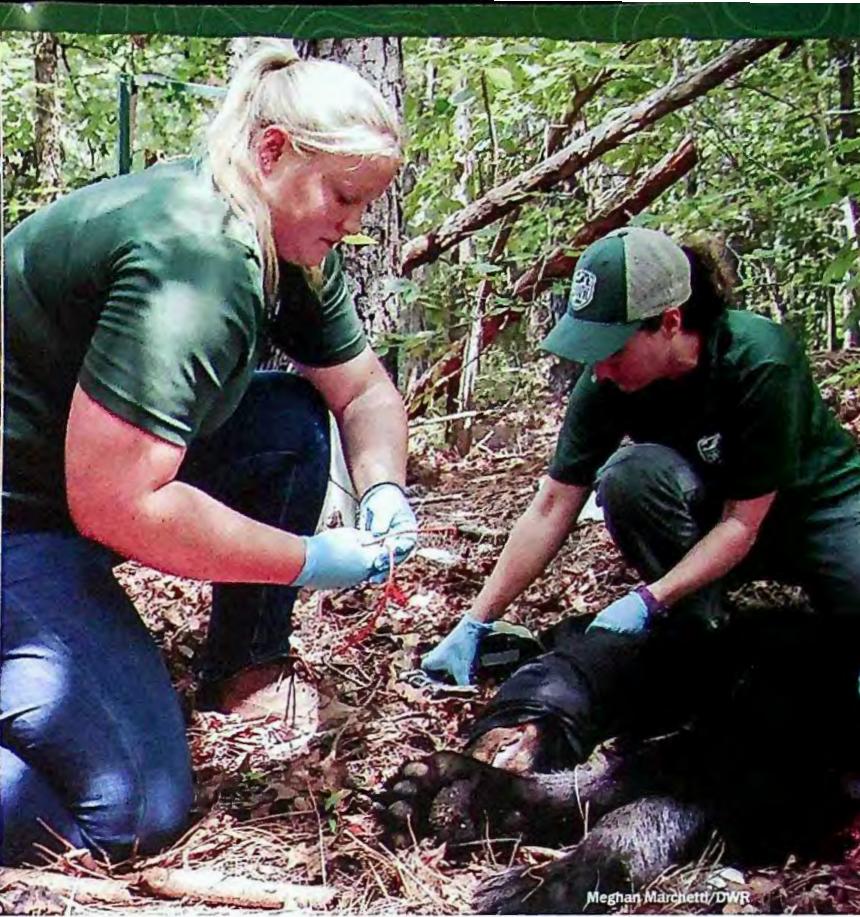
7.1 million wildlife viewers spent \$654 million on wildlife watching-related expenditures



Meghan Marchetti/DWR



Meghan Marchetti/DWR



Meghan Marchetti/DWR

## Funding our Future

**D**WR depends on sustainable revenue from a number of sources. These include hunting and fishing licenses and permits, boat registrations and titles, and federal funds—some of which are based in part on the number of hunting and fishing licenses sold and the number of boats registered each year.

The department's conservation and outdoor recreation efforts also benefit from the sale of Virginia Conservation License Plates, branded merchandise, *Virginia Wildlife* magazine and calendar sales, Restore the Wild memberships, and donations.

Just as importantly, DWR increasingly depends on the transfer by the Virginia General Assembly of funds associated with the Virginia sales and use taxes on watercraft, as well as to sales tax on hunting, fishing, and wildlife-watching equipment (commonly referred to as HB38), purchased in the Commonwealth.

DWR is constantly seeking ways to increase these existing funding sources and to develop funding partnership with other state agencies, non-profits, and private businesses.



### HOW YOU CAN HELP

- By purchasing hunting and fishing licenses and permits
- By becoming a Restore the Wild member
- By purchasing a firearm or ammunition, or equipment for fishing, archery, or wildlife watching
- By registering and buying fuel for your boat
- By subscribing to *Virginia Wildlife* magazine and purchasing a *Virginia Wildlife* calendar
- By purchasing DWR-branded merchandise from DWR's website
- By purchasing a Conservation License Plate through DMV
- By donating to DWR and the Wildlife Foundation of Virginia Partnership Fund
- By engaging DWR through sponsorships and public-private partnership opportunities



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